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ENVIRONMENTAL ASSESSMENT

Simultaneous Offset Instrument Approach/Precision Runway Monitor Project

to serve

San Francisco International Airport (SFO)
San Francisco, CA

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March 20, 2000

This Environmental Assessment becomes a federal document when evaluated and signed by the responsible FAA official.

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Prepared by:

Parsons Harland Bartholomew & Associates, Inc.
2233 Watt Avenue, Suite 330
Sacramento, CA 95825

March 20, 2000

This Environmental Assessment becomes a federal document when evaluated and signed by the responsible FAA official.

Signature

Date

GENERAL INFORMATION ABOUT THIS DOCUMENT

WHAT'S IN THIS DOCUMENT: *This document contains a Draft Environmental Assessment, which examines the environmental impacts of a proposed project to install and operate at San Francisco International Airport (SFO) a Precision Runway Monitor and an Instrument Landing System comprised of a Localizer with distance measuring equipment and a glide slope. In conjunction with the equipment installation, this document will assess the approach procedures associated with the implementation of the instrument approach and changes required to existing aircraft feeder routes.*

WHAT YOU SHOULD DO: *Read the Draft Environmental Assessment. If you have important information that has not been considered in this document or comments about the conclusions, either attend the Public Informational Meetings or send your written comments to the address below. Copies of this document are also available for review at the SFO Planning and Environmental Affairs office, and local libraries including the San Francisco Larkin Street branch, San Jose San Carlos Street branch, Oakland 14th Street branch, Fremont Main, and Foster City Hillsdale Blvd. branch.*

Send Written Comments To:
Rob Brueck
Parsons
2233 Watt Avenue, Suite 330
Sacramento, CA 95825

Attend a Public Meeting on:

April 19, 2000 or April 20, 2000
7:00 p.m. to 9:30 p.m.
San Mateo Council Chambers
City Hall Building
330 W. 20th Avenue
San Mateo, CA

May 2, 2000
7:00 p.m. to 9:30 p.m.
Isaac Newton Auditorium
Santa Clara County Government Center – East Wing
70 W. Hedding Street
San Jose, CA

Cutoff date for written comments: July 7, 2000

WHAT HAPPENS AFTER THIS: *After comments are received from the public and reviewing agencies, the Federal Aviation Administration (FAA) will prepare a final Environmental Assessment. When the environmental review process is completed, the FAA will determine if the document environmentally supports the proposed action and there are no significant impacts. A Finding of No Significant Impacts will then be prepared that sets forth the decision(s) made on the proposed action. If significant impacts exist, and these impacts can not be mitigated to below a significant level, the FAA will prepare an Environmental Impact Statement.*

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EXECUTIVE SUMMARY

INTRODUCTION

The present work discloses the possible environmental effects of improvements to San Francisco International Airport (SFO) air traffic systems in compliance with federal law. The Proposed Action would allow the installation of a Precision Runway Monitor and improved Instrument Landing System (including Localizer with distance measuring equipment and a glide slope system) for the purpose of implementing a Simultaneous Offset Instrument Approach (SOIA) to ease the backup delays to present day scheduled service into the Bay Area region during periods of inclement weather. This document is an assessment of the various factors conceivably affecting the project's environment, including possible environmental effects as a result of changing air traffic feeder routes into the region following installation of the equipment and modification of existing approach procedures.

PURPOSE

The project is termed the "Proposed Action" because building it may have potential environmental impacts, however minor or problematic. This document is made available for review and comment in conformance with the disclosure and feedback provisions of the National Environmental Policy Act. When reviewed by responsible agencies and citizens, the environmental assessment is either found to lead to a "Finding of No Significant Impact" or to an Environmental Impact Statement. The purpose of the present document is the first step of a multi-part disclosure process that would lead to the building, or alternatively, no-build of the project.

In addition, this environmental assessment conforms to the President of the United States' Council on Environmental Quality (CEQ) and Department of Transportation (DOT) regulations, including requirements of the Federal Aviation Administration (FAA). In keeping with these regulations and requirements, the document includes major chapters that describe the regulatory framework (purpose and need), review of possible alternatives, description of the affected environment, disclosure of potential impacts to the environment, indications of who prepared the document, and technical appendices.

IMPACTS

The National Environmental Policy Act (NEPA) procedures charge respective federal agencies to disclose environmental information to public officials and citizens before decisions are made and before actions are taken to build projects. The issues to be addressed in the Environmental Assessment have been identified through public scoping and FAA Order 1050.1D (*Policies and Procedures for Considering Environmental Impacts).* Issues evaluated in the EA include noise, land use, social, induced socio-economic, environmental justice, air quality, water quality, traffic, cultural, biological, floodplains, coastal resources, wild and scenic rivers, farmland, energy supply and natural resources, light emissions, electronic emissions, solid waste, construction, visual, and hazardous materials. The impacts that are disclosed by this environmental assessment are tabulated in Table ES-1.

Table ES-1

Summary of Impacts by Alternative

Impact Category	Proposed Action	No Action
Noise	Less-than-significant	No changes from existing conditions
Compatible Land Use	Less-than-significant	No changes from existing conditions
Social (employment and transportation)	Less-than-significant with implementation of transportation measures	No changes from existing conditions
Induced Socioeconomic	No impacts	No changes from existing conditions
Environmental Justice	No impacts	No changes from existing conditions
Air Quality	No impacts	Little change from existing conditions
Water Quality	Less-than-significant	No changes from existing conditions
Transportation	No impacts	No changes from existing conditions
Historic, Architectural, and Archaeological Resources	Less-than-significant with implementation of standard mitigation measures	No changes from existing conditions
Biotic Communities	No impacts	No changes from existing conditions
Endangered and Threatened	No impacts	No changes from existing conditions
Wetlands	Less-than-significant with implementation of appropriate mitigation measures	No changes from existing conditions
Floodplains	No impacts	No changes from existing conditions
Coastal Zones	No impacts	No changes from existing conditions
Wild and Scenic Rivers	Not applicable	Not applicable
Farmlands	Not applicable	Not applicable
Energy Supply and Natural Resources	No adverse impacts	No changes from existing conditions
Light Emissions	No impacts	No changes from existing conditions
Electronic Emissions	No impacts	No changes from existing conditions
Solid Waste	No impacts	No changes from existing conditions
Construction	Less-than-significant with implementation of appropriate mitigation measures	No changes from existing conditions
Visual	Less-than-significant	No changes from existing conditions
Hazardous Materials	Less-than-significant	No changes from existing conditions

Source: Parsons 2000

Notes: Where such impacts are negligible the phrase "no impacts" appears. Where impacts would not exceed a threshold or significant criteria, the phrase "Less-than-significant" is used. In those cases where the review of baseline conditions when compared with building the project reveals that environmental affects are possible, specific mitigation measures are set forth that would reduce effects to the environment to a "less than significant" level.

In summary, implementation of the Proposed Action would have either no impacts, or potential impacts that would be considered less than significant with implementation of the mitigation proposed.

The only potential impacts identified in the EA had to do with minimal effects on community noise level contours (such as slightly greater noise levels in the salt evaporators and marshes of the south bay area), slight noise from aircraft above 6,000 feet over land uses not currently affected, possibilities of siltation into the bay if standard Best Management Practices are not used appropriately, possible impacts to local airport traffic in the area, potential impacts on buried historical or cultural remains if unearthed during excavation of footings and foundations, possible disturbance to tidal marsh and seasonal wetland by construction of the Precision Runway Monitor (due to their proximity to the construction area), effects on construction workers from airport operations, negligible visual effects, and slight chances of release of hazardous material through disturbance of existing landfill or spill of construction fuels or paints (unless precautions are implemented).

MITIGATION

The nature of environmental mitigation varies depending upon the nature of the physical or natural environment to be affected by the Proposed Action. Mitigation measures have been set forth for possible affects on water quality, transportation, cultural resources, wetlands, construction, and hazardous wastes. For example, in the case of transportation effects on the environment, the mitigation recommended would involve better and more efficient scheduling in getting heavy equipment on and off the site to ameliorate impacts to traffic. In each case, mitigation is explained in fuller detail, in Chapter 4, where appropriate.

CONCLUSIONS

This Environmental Assessment study may or may not support the conclusion that the project would not substantially affect the environment. Upon review of the Final EA document, responsible agency officials of the Federal Aviation Administration would either decide to produce a "Finding of No Significant Impact" based upon the present level of disclosure (the Final Environmental Assessment), or require a fuller disclosure of possible environmental effects in an "Environmental Impact Statement."

CHAPTER 1
PURPOSE AND NEED

1.1 PURPOSE OF THE ENVIRONMENTAL ASSESSMENT

The purpose of this Environmental Assessment (EA) is to evaluate the significance of any environmental impacts resulting from the installation and operation at San Francisco International Airport (SFO) of a Precision Runway Monitor (PRM) and an Instrument Landing System (ILS) comprised of a Localizer with distance measuring equipment (Localizer/DME) and a glide slope. In conjunction with the equipment installation, this document will assess the approach procedures associated with the implementation of a Simultaneous Offset Instrument Approach (SOIA) and changes in feeder routes.

An EA has been prepared for the Proposed Action (the "Project") because it may have potential minor or uncertain environmental impacts. An EA requires analysis and documentation similar to that of an Environmental Impact Statement (EIS) but with somewhat less detail and coordination. Depending upon whether certain environmental thresholds of significance are exceeded or not, an EA will either lead to a Finding of No Significant Impact (FONSI) or to the requirement for the preparation of an EIS.

The Final EA will be used by the appropriate decision-makers in their determination to approve or disapprove the Project. The document is made available for review and comment as part of the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C., §432 et seq.).

1.2 GENERAL INFORMATION ABOUT THE DOCUMENT

The format and content of the EA conforms to the requirements set forth in the President's Council on Environmental Quality (CEQ) regulations that implement the procedural provisions of NEPA (Title 40, CFR 1500-1508); and to the U.S. Department of Transportation (DOT) Federal Aviation Administration (FAA) implementing requirements as contained in DOT Order 5610.1C, *Procedures for Considering Environmental Impacts*, and in FAA Order 1050.1D, *Policies and Procedures for Considering Environmental Impacts.*

In keeping with NEPA, DOT, and FAA guidelines, this document consists of five main chapters. The format and content of these chapters are summarized as follows:

> Chapter 1 – Purpose and Need includes a description of the general environmental regulations with which this EA is to be prepared, background information, the purpose and need of the project, and a detailed description of the Proposed Action.
>
> Chapter 2 - Alternatives contains a review of the possible alternatives evaluated as part of the EA analysis, including the Proposed Action and the No Action alternatives. This chapter summarizes in comparative form the environmental consequences associated with each alternative considered.

Chapter 3 – Affected Environment provides a description of the natural and human environment that serves as a general setting for the Proposed Action and alternatives.

Chapter 4 - Environmental Consequences and Mitigation Measures details specific potential impacts of the Proposed Action and the No Action alternatives on the environment. It also identifies potential measures to mitigate adverse environmental consequences.

Chapter 5 - Preparers indicates the names of individuals primarily responsible for preparing the EA.

Appendices contain technical analyses used in the development of the document including a list of references (Appendix A), a glossary (Appendix B), and a list of reviewers and comments (Appendix C).

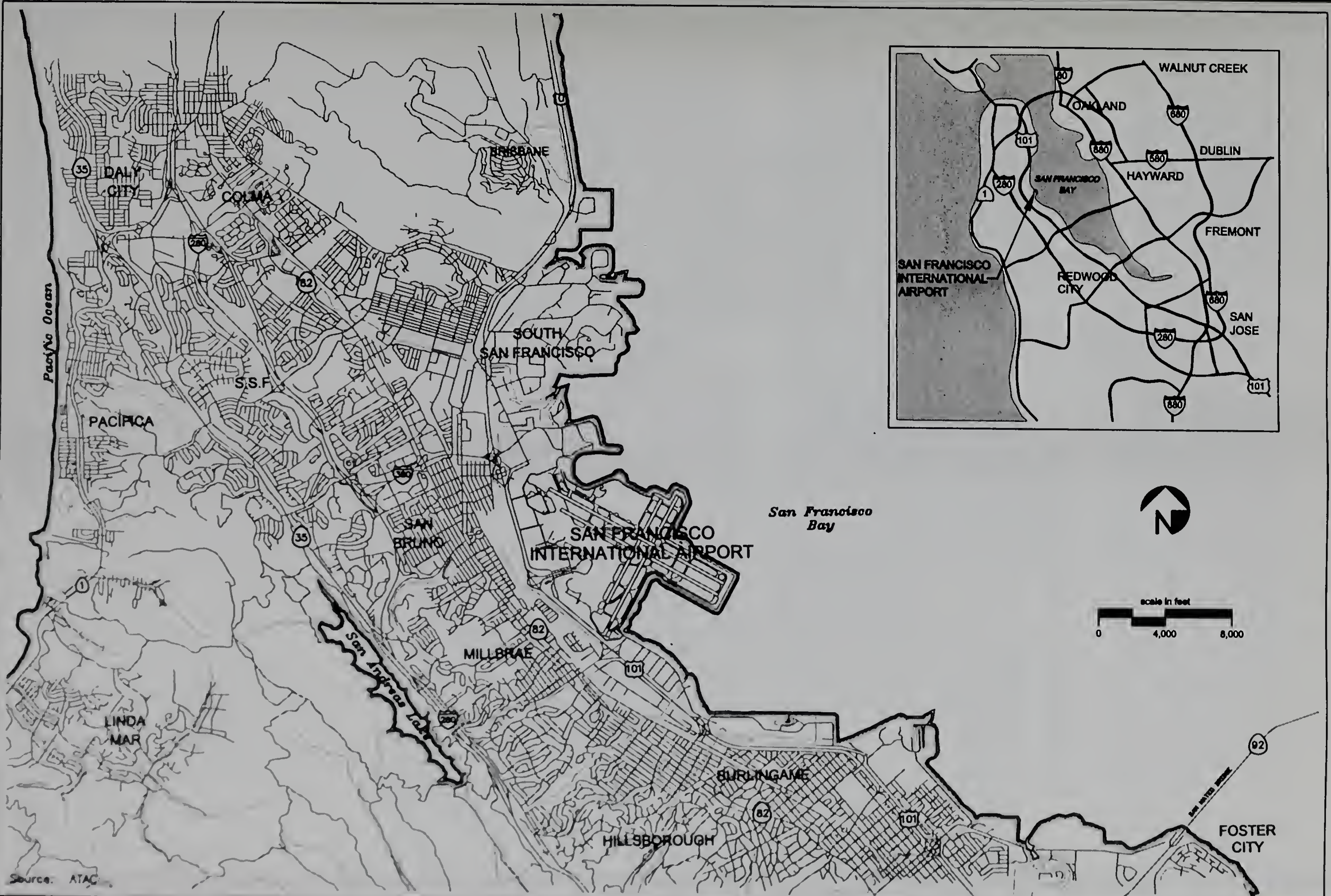
1.3 PROPOSED FEDERAL ACTION

The requested Federal action being considered in this EA includes the FAA's approval of the Airport Layout Plan (ALP), proposed by the City and County of San Francisco, for the relocation and installation of navigational aids (the ILS and PRM) and the implementation of various air traffic control procedures related to the operation of the SOIA (including a change in feeder routes). More specifically, the proposed Federal action includes the relocation of existing Federal air traffic navigational aids (the Localizer/DME); installation of new electronic and visual navigational and landing systems (the PRM); and establishment of new flight procedures, including instrument procedures, for the proposed new SOIA on Runway 28R.

1.4 LOCATION OF THE PROJECT

SFO is located on the San Francisco peninsula, 10 miles south of the City of San Francisco (Figure 1-1). The Airport, although owned and operated by the City and County of San Francisco, is located in San Mateo County. The Airport is abutted by the cities of South San Francisco to the north, San Bruno to the west, and Millbrae to the south. The eastern boundary of the Airport is San Francisco Bay. The Bayshore Freeway (Highway 101), a major north-south thoroughfare, passes along the western boundary and provides access to the Airport.

Other communities in the vicinity of SFO include Brisbane, Burlingame, Colma, Daly City, Foster City, Hillsborough, Pacifica, and San Mateo. There are a number of other commercial and general aviation airports in the area including Oakland International Airport and Hayward Municipal Airport. Further down the peninsula, south of SFO, are San Carlos Municipal Airport, Palo Alto Municipal Airport, Half Moon Bay Airport, Moffet Federal Airfield, and San Jose International Airport. Southeast of San Jose is the Reid-Hillview Airport. Both Oakland International and San Jose International Airports provide major commercial air carrier service to the region.



SFO
SOIA/PRM EA

Location Map

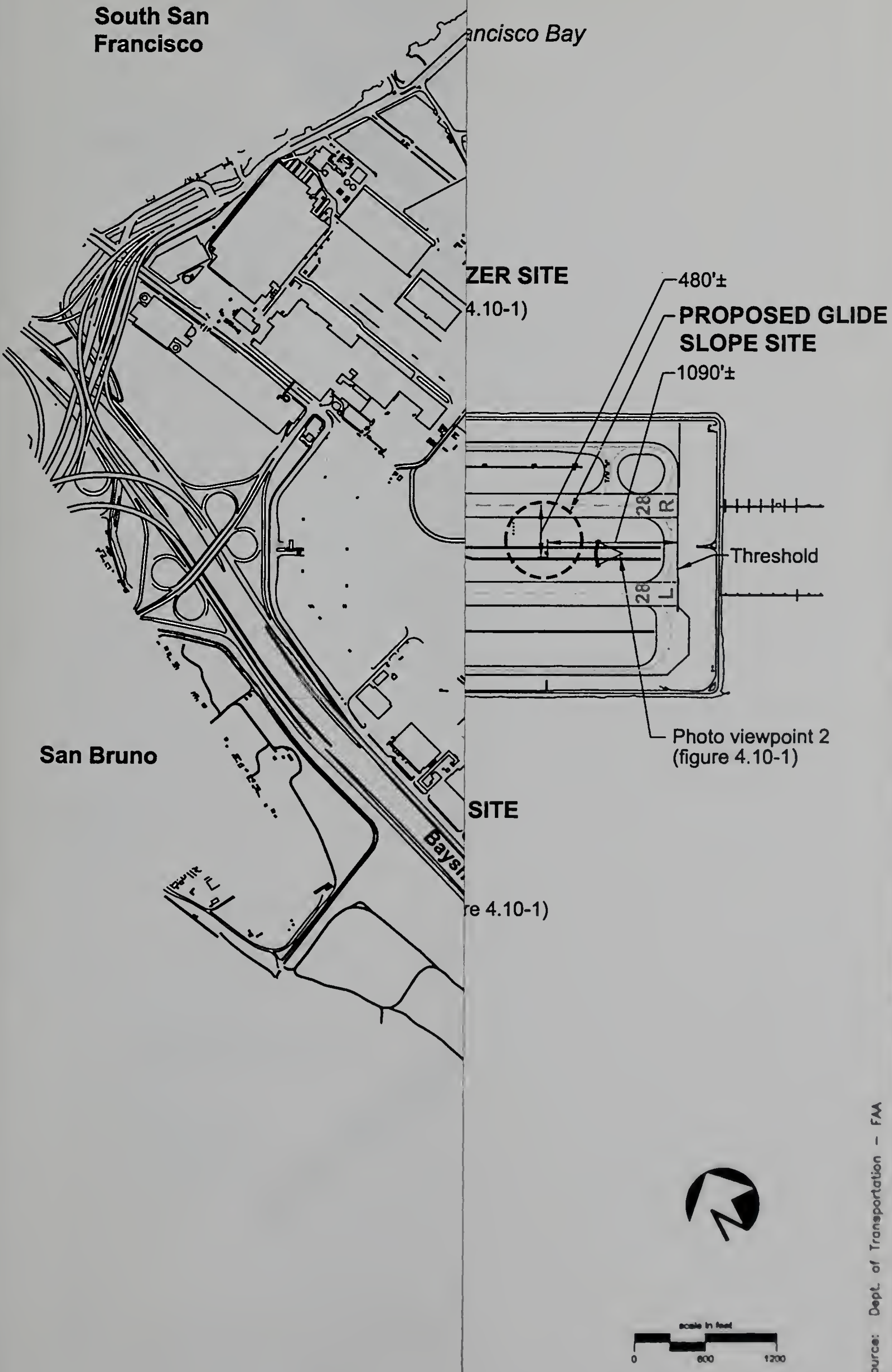
PARSONS
HARLAND BARTHOLOMEW
& ASSOCIATES, INC.
Figure 1-1

SFO sits on approximately 2,700 acres of unincorporated land in northern San Mateo County (Figure 1-2). Approximately 1,700 acres of land are devoted to airside activities (e.g. runways, taxiways), and approximately 1,000 acres are used for landside facilities such as terminals and parking. There are four runways. The parallel east-west runways 10R/28L and 10L/28R are 10,600 and 11,870 feet long, respectively. The two shorter parallel runways 1L/19R and 1R/19L are 7,000 and 8,900 feet long, respectively. The Airport is built on areas reclaimed from tidelands and marshlands in the early to mid 1900s.

1.5 PURPOSE OF THE PROJECT

SFO is proposing to introduce a SOIA to runways 28L and 28R. The benefits of SOIA would include reduction of delays during certain Instrument Flight Rules (IFR) conditions (i.e., when meteorological conditions are such that visibility is less than the minimum specified for safe visual flight operations). SOIA would also replace existing arrival procedures during visual Flight Rules (VFR) conditions. By incorporating appropriate navigational/tracking equipment and flight procedures, the proposed SOIA would safely allow offset parallel approaches into SFO at separation minimums not currently afforded given the existing runway layouts. Implementation of the SOIA procedure would also require the reconfiguration of feeder routes servicing runway 28R and 28L approaches into SFO, and changes in the final approach tracks to Runway 28R (Figures 1-3 and 1-4).

The purpose of this Project is to maintain the throughput of scheduled flights onto both runways 28L and 28R when cloud cover is between 3,500 feet and 1,600 feet, while maintaining the existing safe, reliable, and efficient aviation system at the Airport. Cloud cover between 3,500 feet and 1,600 feet exists approximately 7.5 percent of the time between 7 am and 10 pm at SFO. The Project would not affect (improve) the landing frequency when cloud cover is below 1,600 feet, which occurs about 17 percent of the time. The required navigational system components for the Project are independent of any current scoping or planning activities for a new runway reconfiguration at the Airport, which is being addressed/reviewed separately. Flight procedures and air traffic arrival routes developed for the SOIA are also independent of any current scoping or planning activities for a new runway reconfiguration at the Airport. However, according to Bay Terminal Approach Control (Bay TRACON, the air traffic control facility for aircraft approaching and departing from area airports) it is anticipated that the modified feeder routes developed for the SOIA project could be used with little or no modification for a future runway reconfiguration project.



Source: Dept. of Transportation – FAA

San Francisco Airport Site

Figure 1-2

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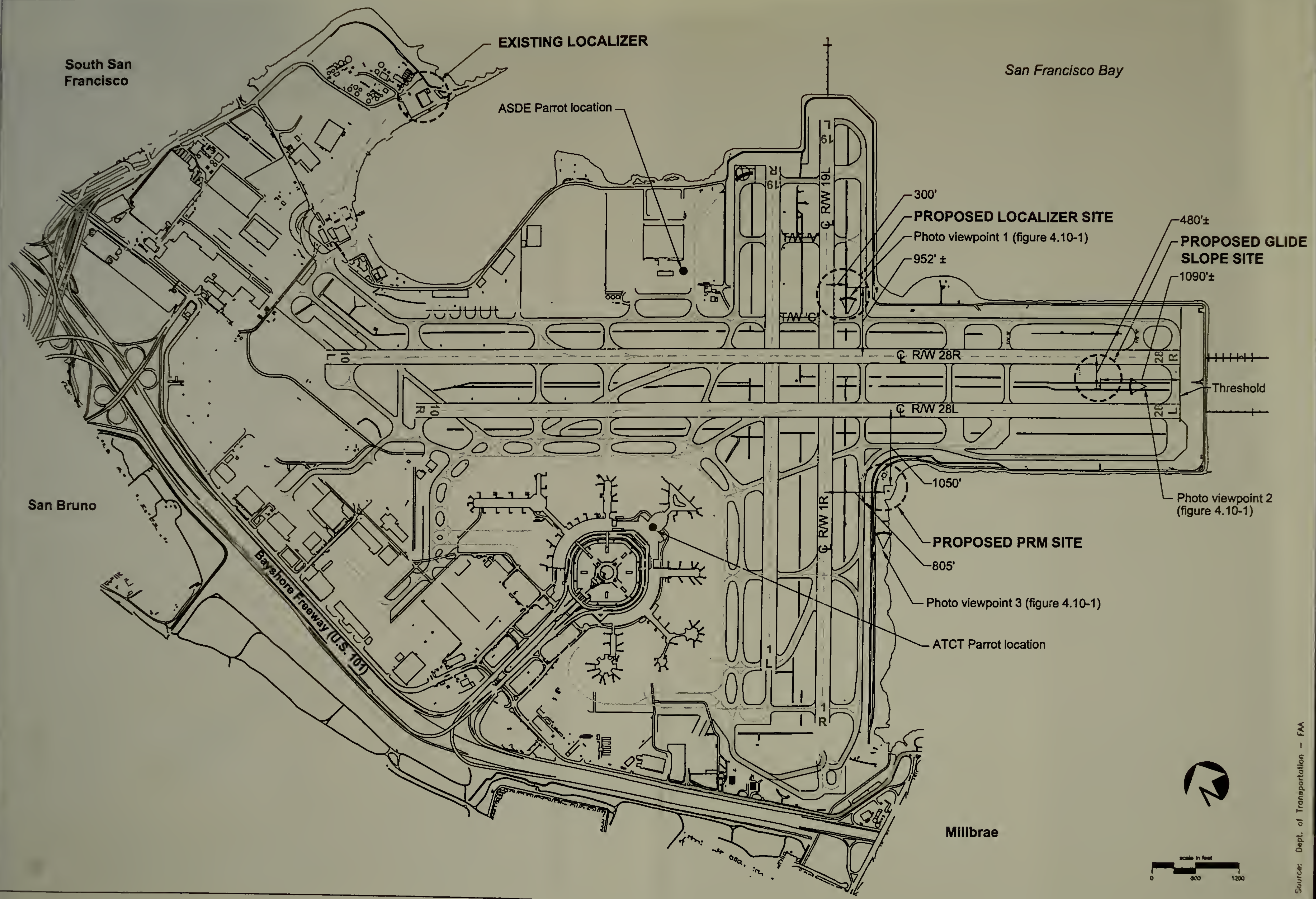
& ASSOCIATES, INC.

SFO
SOIA/PRM EA

File: 738312\Graphics\Sfo_site.dwg Date: 03/09/2000



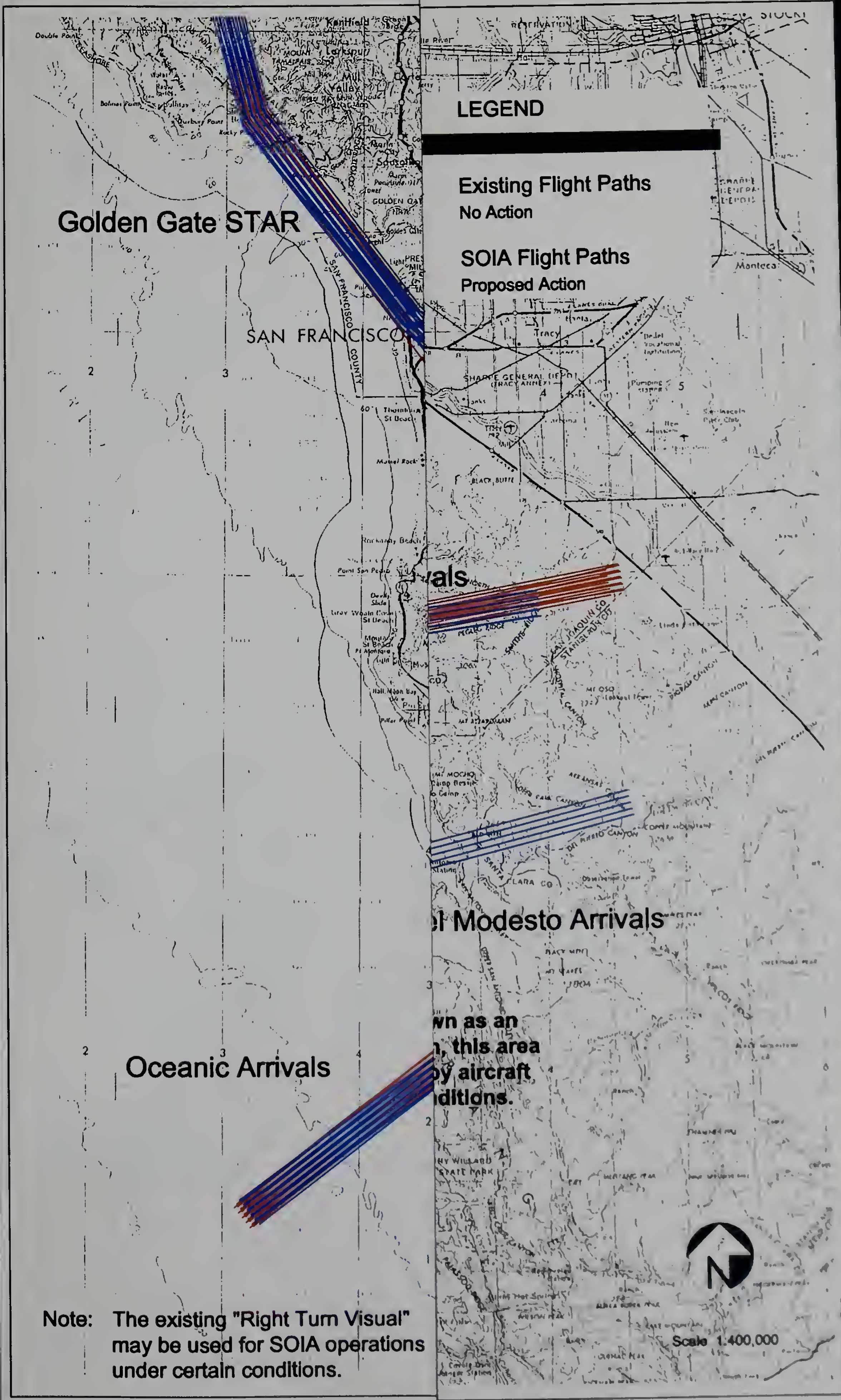
Source: Dept. of Transportation – FAA

San Francisco Airport Site

PARSONS
HARLAND BARTHOLOMEW
& ASSOCIATES, INC.
Figure 1-2

SFO
SOIA/PRM EA

Date: 03/06/2000



Note: The existing "Right Turn Visual" may be used for SOIA operations under certain conditions.

Source: ATAC

Figure 1-3

No Action and Proposed Action Arrival Flight Track Centerlines

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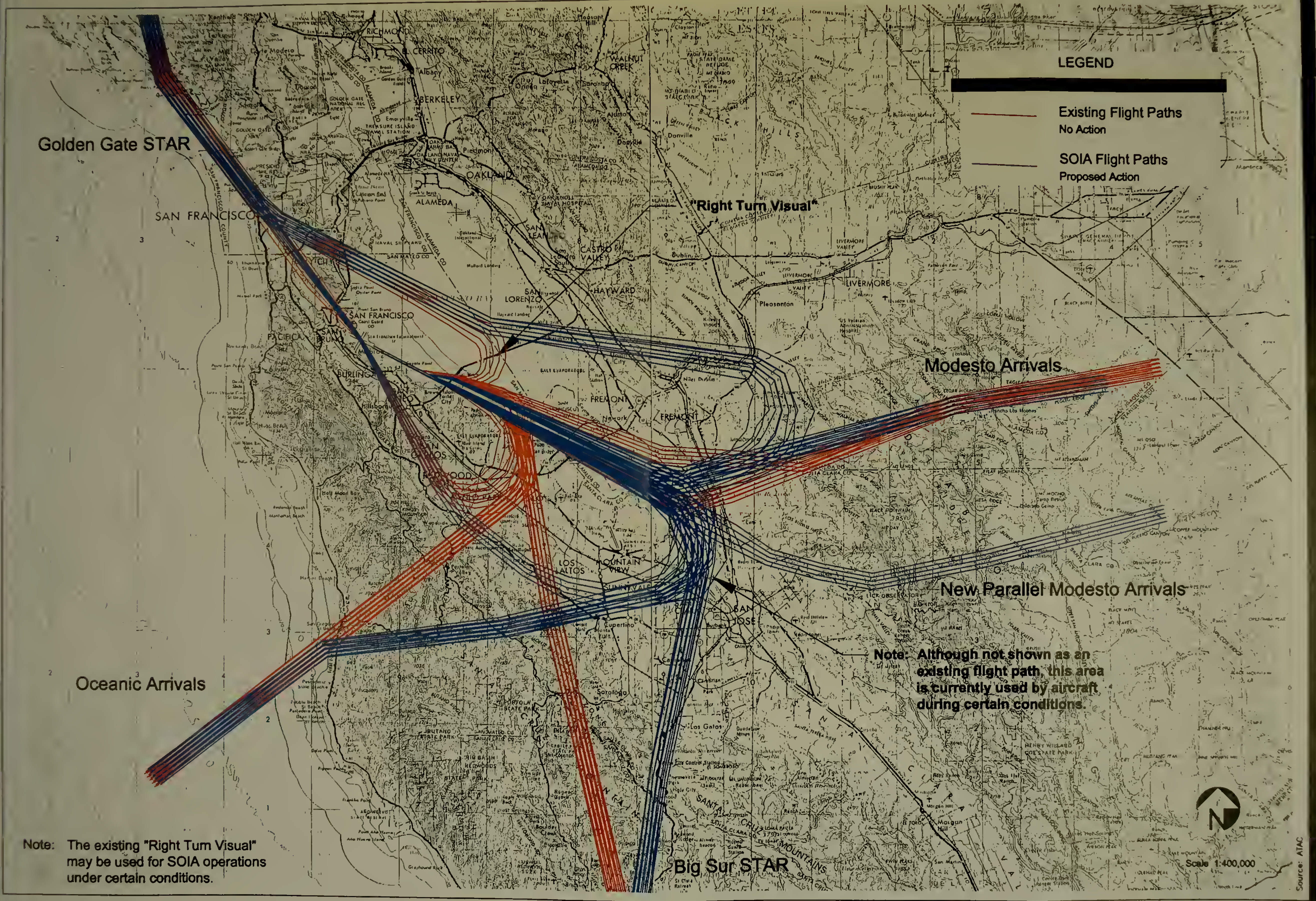
& ASSOCIATES, INC.

SFO
SOIA/PRM EA

File: 736312\Graphics\Fltpaths.dwg Date: 03/14/2000



Note: Although not shown as an existing flight path, this area is currently used by aircraft during certain conditions.

Note: The existing "Right Turn Visual" may be used for SOIA operations under certain conditions.

Source: ATAC

SFO
SOIA/PRM EA

No Action and Proposed Action
Arrival Flight Track Centerlines

PARSONS
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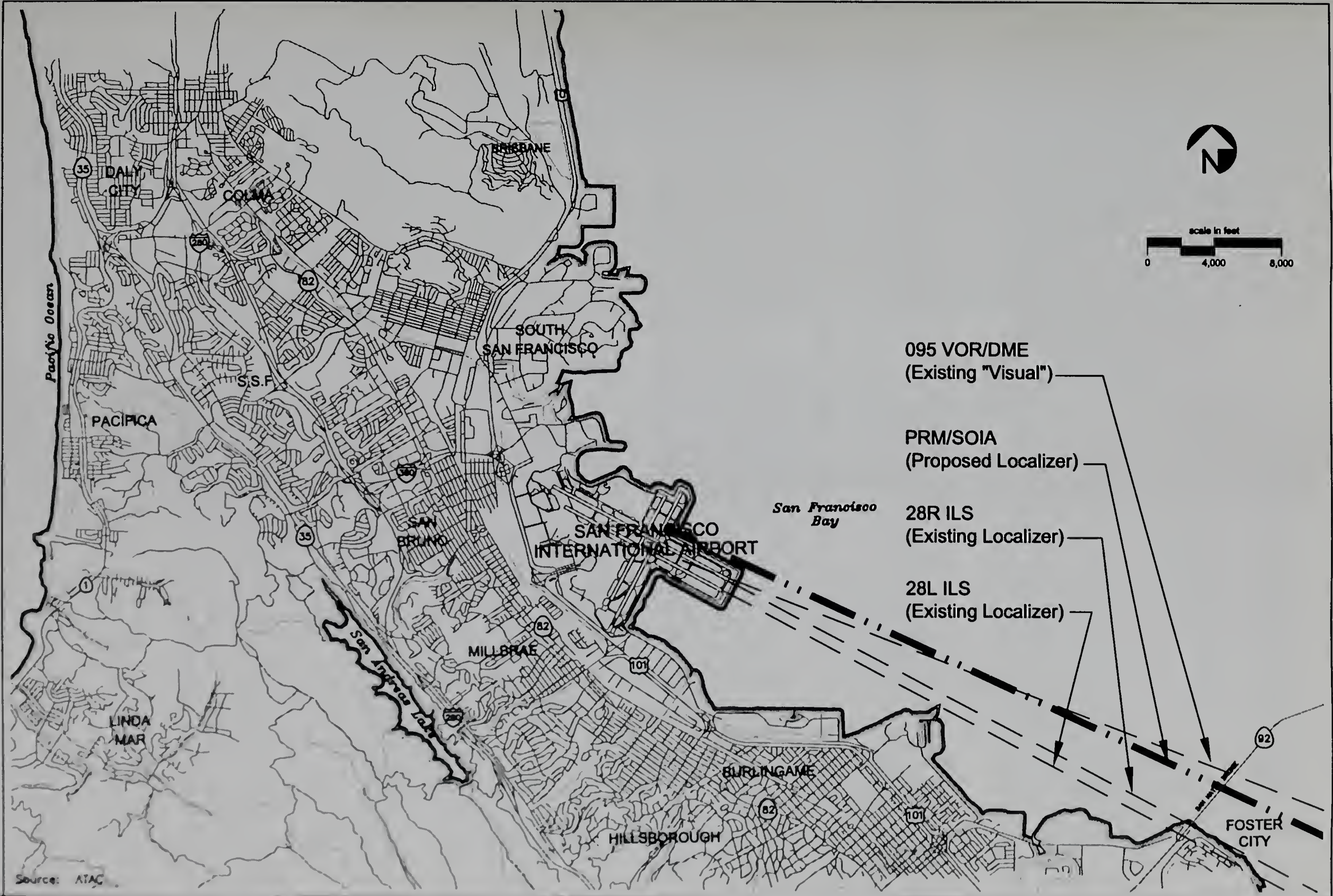
& ASSOCIATES, INC.

Figure 1-3



Source: ATAC

SFO
SOIA/PRM EA

Approach Tracks

PARSONS
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& ASSOCIATES, INC.
Figure 1-4

1.6 NEED FOR THE PROJECT

Aircraft are flown under guidelines established in Federal Aviation Regulation (FAR) Part 91. These guidelines designate two categories of flight rules as set forth by the FAA. These two categories are Visual Flight Rules (VFR) and IFR. Under VFR, pilots rely on their visual senses to navigate while in flight. VFR is a system of "see-and-be-seen," where pilots are not dependent upon outside air traffic control assistance for their flight activities. VFR flight is conducted during periods when weather conditions are considered to be clear enough to see and be seen, with an adequate margin for safety. Conversely, under IFR, pilots rely on a comprehensive system of navigational aids that provide information directly to the cockpit regarding course guidance, direction, altitude, and other important data. Commercial aircraft frequently operate using IFR even in VFR weather conditions.

The SOIA system is needed to reduce delays that currently occur during certain poor weather conditions at SFO. The reduction in delays provides a benefit in terms of the efficient transport of people and goods between the Bay Area, national, and international markets, and would sustain regional economic activity.

Under existing operations during VFR conditions, by maintaining parallel approach streams to runways 28L and 28R, approximately 60 aircraft per hour can land at SFO. The throughput capacity at SFO drops to 30 arrivals per hour when cloud cover drops to 3,500 feet and single stream approaches are required under IFR conditions. When inclement weather mandates single stream approaches, aircraft arrival and departure delays occur not only at SFO but, due to the interconnections of the airline schedules, at airports nationwide. These delays spill over into succeeding hours, disrupting scheduled service and stretching operations throughout the day and later on into the night.

Installation of the ILS and PRM equipment for the SOIA procedure would allow approximately 38 arrivals per hour (versus the 30 currently achieved) when cloud cover is in the 1,600 to 3,500 foot above ground level (AGL) range. Based on meteorological data, SFO has estimated that this system could be utilized approximately 26 days of the year (7.5 percent of the time) to increase hourly arrival acceptance rates during IFR conditions. The Project would not increase the estimated 30 arrivals per hour when cloud cover drops below 1,600 feet (which occurs approximately 17 percent of the time).

SFO has been identified as one of the leading airports nationally in terms of flight delays (SFO Master Planning Office pers. com. 1999). The DOT Office of Aviation Enforcement and Proceedings puts out a monthly report entitled the *Air Travel Consumer Report.* This report provides on-time arrival and departure statistics for the 10 major air carriers at 29 major airports in the United States. On-time arrival percentages at SFO appreciably lag behind nationwide averages. There is a 20 percentage point difference in some months (November to February and May to June). Inclement weather conditions at SFO are a primary cause of the disparities in these arrival delay statistics. A review of the *Air Travel Consumer Report* data also shows that the percentage of on-time departures from SFO trails the nationwide airport average.

SFO has experienced steady growth in aviation activity over the past 25 years, and this growth is projected to continue well into the next century. SFO plays a vital role in the National Airspace

System (NAS) as well as the state and regional transportation systems. SFO is the seventh busiest airport in the world and the fifth busiest in the nation. If operational levels at SFO increase in the future, the impact of delays attributable to inclement weather conditions and the current single stream arrival path procedure may become more pronounced.

The number of aircraft operations at an airport is essentially demand driven. The demand for air transportation, both cargo and passenger, is dependent upon numerous factors such as regional and national economic activity, population growth, industry costs (fuel, labor), and the costs of alternate modes of transportation (surface, rail, water). The Project would not affect the demand for air transportation. Since weather conditions at SFO cannot be accurately forecast with a precision of less than an eight-hour period, the total scheduled number of daily aircraft operations would usually occur irrespective of real-time weather conditions (unless the airport is forced to shut down).

The PRM, a necessary component of the proposed SOIA, is an electronically scanned secondary surveillance radar. The PRM reduces lateral separation standards and allows lower weather minimums to be used. Its purpose is to allow Air Traffic Control (ATC) to monitor and control air traffic executing the proposed SOIA. The SOIA approach can only be used when the reported weather values are a 1,600 foot ceiling or above, and visibility of four miles or greater.

By contrast, the radar system currently used for monitoring aircraft at SFO is the Airport Surveillance Radar-9 (ASR-9) which involves the use of a mechanically rotated antenna. Aircraft, particularly in the approach phase, are identified and controlled by the use of the ASR-9 in lower cloud ceiling conditions. Tracking of incoming aircraft is limited by the rotation rate of the antenna, necessitating only single stream approaches to the parallel runways during IFR conditions. Using the improved accuracy and high update rates available with the PRM system, approaching aircraft could be more closely supervised by ATC, allowing for parallel stream approaches, thus enhancing the operational efficiency of SFO.

1.7 BACKGROUND ON THE PROJECT

SFO is the airport most affected by air traffic delays nationally (SFO Master Planning Office 1999). Air traffic delays are caused by low visibility conditions resulting from inclement weather. Runways 28L and 28R are used primarily for arrivals. Combined, these two runways account for approximately 93 percent of all arrivals to SFO and 10 percent of departures. All nonstop, long-distance, international flights requiring maximum runway lengths for departure leave from Runway 28R. Most other departures use runways 1L and 1R. The remaining runway pairs (10 and 19) are used on a periodic basis and as weather conditions require.

The Airport has spearheaded efforts to reduce delays through the establishment of an instrument approach to Runway 28R. In 1992, a Localizer/DME was installed on San Francisco Community College property adjacent to Seaplane Harbor, northeast of Runway 28R. Although this approach procedure was published, the procedure was only used on several occasions and later discontinued. As part of this Project, this existing equipment will be removed and the site will be returned to its prior condition (i.e., asphalt).

1.7.1 Background on FAA Guidelines

The mission of the FAA is to serve the nation by fostering a safe, reliable, and efficient aviation system that contributes to national security and the productivity of United States aviation. This is accomplished through the issuance and positive enforcement of aviation regulations, the control of air traffic with modern facilities, the use of trained personnel, and the maintenance of the NAS infrastructure.

FAA Advisory Circular 150/5300-13, *Airport Design,* provides FAA standards and recommendations for airport design. Chapter 2, Section 208a(1) of the Advisory Circular specifies parallel runway separation standards for conducting simultaneous IFR approaches at airports. The Advisory Circular states that dual simultaneous precision instrument approaches are normally approved at airports with parallel runway centerline separation of 4,300 feet. At SFO the current runway separation between Runway 28L and 28R is only 750 feet. The Advisory Circular also states that "on a case-by-case basis, the FAA would consider proposals utilizing separations down to a minimum of 3,000 feet where a 4,300 foot separation is impractical. This reduction in separation requires special, high-update radar, monitoring equipment, etc." The proposed PRM facility is one such high-update radar that, when installed, would allow the FAA to consider these reduced separations minimums.

1.8 DESCRIPTION OF THE PROJECT

The Project would provide for a new SOIA procedure and an ILS/PRM at SFO, Runway 28R, for use during periods of cloud cover between 3,500 and 1,600 feet. System components include a Localizer/DME and a glide slope (collectively, the ILS) and are necessary for the operation of the proposed SOIA. The PRM component of the proposed SOIA allows for lower weather minimums due to a reduced lateral separation standard. The locations for these components are shown on Figure 1-5. Photographs of the sites proposed for the ground-based equipment are shown in Figure 1-6. In addition to ground-based equipment, the new SOIA procedure would require changes in the final approach tracks to Runway 28R (Figure 1-4) and a necessary reconfiguration of feeder routes serving the approach (Figure 1-3). These feeder route changes would be adopted for all future operations on runways 28L and 28R. The reconfiguration of feeder routes would be as follows:

1) Golden Gate STAR (north over-flight) will approach the Airport from the north along the coast, it will continue southeastward to Interstate 680 (I-680) where it will turn to approach runways 28R and 28L from the east. Under certain conditions however, the proposed SOIA will utilize the "Right Turn Visual" approach and continue along the existing feeder route.
2) Golden Gate STAR (south over-flight) follows the existing approach path from the north along the coast, veering off from the Golden Gate STAR (north over-flight) at the Golden Gate Bridge. This approach continues south to follow I-280 until turning north just prior to the City of San Jose.
3) Oceanic Arrivals proceed from the southwest over the ocean until reaching the coast whereupon they veer east until meeting the revised Golden Gate STAR (south over-flight).

4) Big Sur STAR will follow a new route northeast of the original Big Sur feeder route approaching the Airport from the south over the Santa Cruz Mountains. The route roughly follows Route 17 until joining with the Golden Gate STAR (south over-flight).
5) Modesto Arrivals will be split into two parallel routes. The existing route will continue to be flown and a second route, parallel to the existing route, will be created approximately 10 miles to the south/southeast. Aircraft will be segregated onto the two routes based upon their wake generating characteristics. Generally, non-generating wake aircraft (light) will use the new southern route and will land on Runway 28L and wake generating aircraft (heavy) will use the existing route and land on Runway 28R.

The following discussion includes a description of the ground-based equipment and the proposed SOIA procedure.

1.8.1 Instrument Landing System

An ILS is a navigational aid that can be used during IFR conditions. The purpose of the ILS is to provide information to the pilot regarding the proper path of descent and the approach of the aircraft relative to the runway centerline. The ILS provides guidance by transmitting radio beams that can be used by properly equipped aircraft to navigate a final approach course to the airport. The ILS consists of a Localizer/DME and glide slope.

1.8.2 Localizer/DME

The Localizer/DME provides horizontal guidance aligned with the offset runway centerline. It operates by sending paired electronic pulses at a specific frequency to the approaching aircraft The DME equipment on the aircraft receives the pulses and transmits them back to the ground station at a different frequency. The time between signal transmission and signal reception is measured by the airborne DME unit, and the slant distance in nautical miles is computed and displayed to the pilot.

The Localizer/DME is an eight-element array, with each element measuring approximately 5 feet high. The concrete pad for the array is 10 feet by 50 feet. An existing Localizer/DME (currently located on airport property and shown on Figure 1-7) would be used for this Project. The existing equipment is not currently in use and would be relocated as part of the proposed Project. Following the relocation, the existing site would be restored to the condition it was before relocation (i.e., asphalt).

The relocated Localizer/DME would be located 300 feet from the centerline of Runway 19L and approximately 952 feet from the centerline of Runway 28R (Figure 1-8). A perimeter of 50 feet in width around the concrete pad footprint would be required for construction work and laydown areas creating a total area of construction disturbance of 16,132 square feet. Obstruction lighting would include omnidirectional flashing and/or non-flashing aviation red obstruction beacons during the nighttime hours, and medium or high intensity flashing white obstruction lights to be used during daytime and twilight conditions. These would be mounted at the highest point of the structure.

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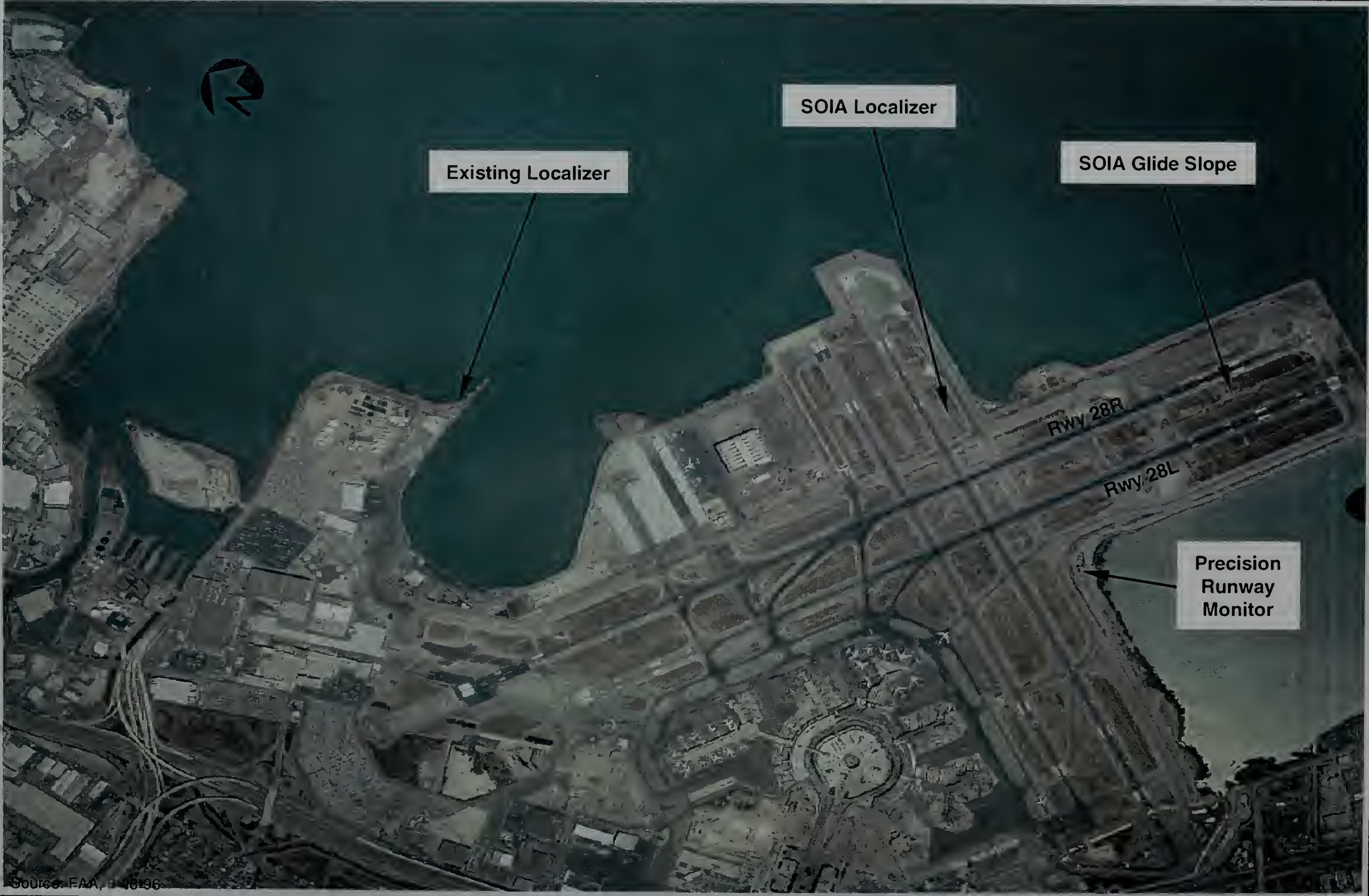

Source: FAA, 8/18/96

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Ground-Based Equipment Location

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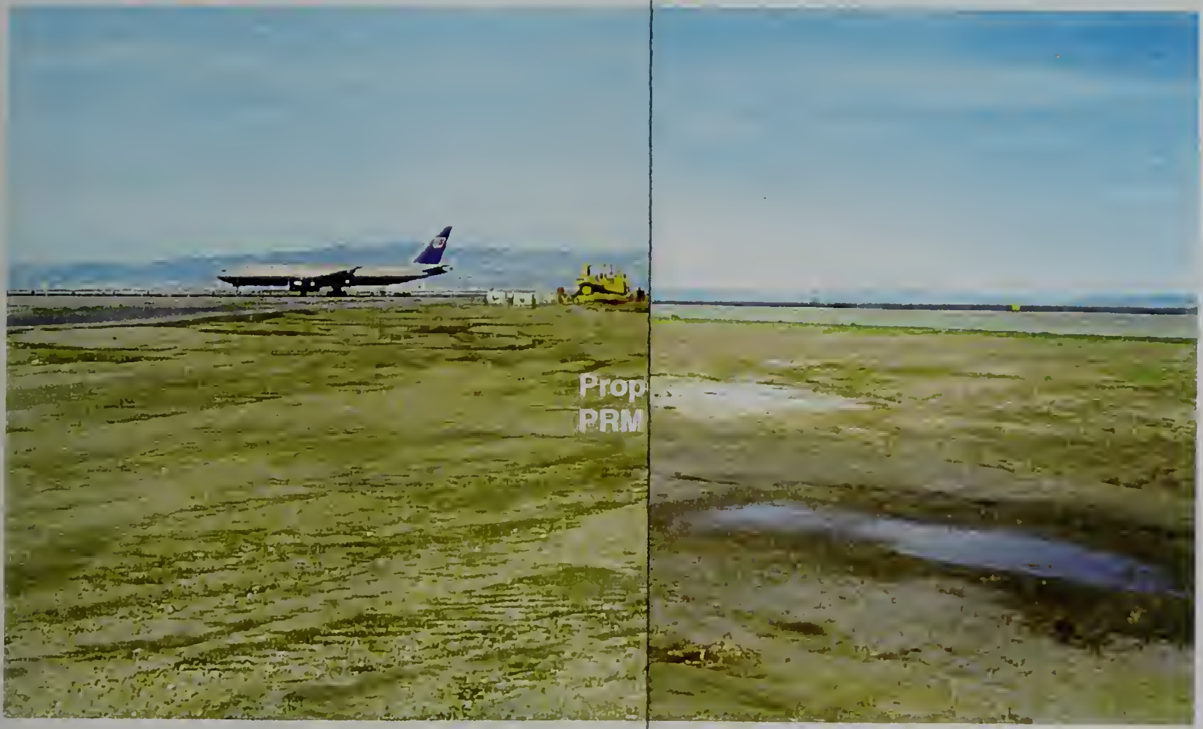
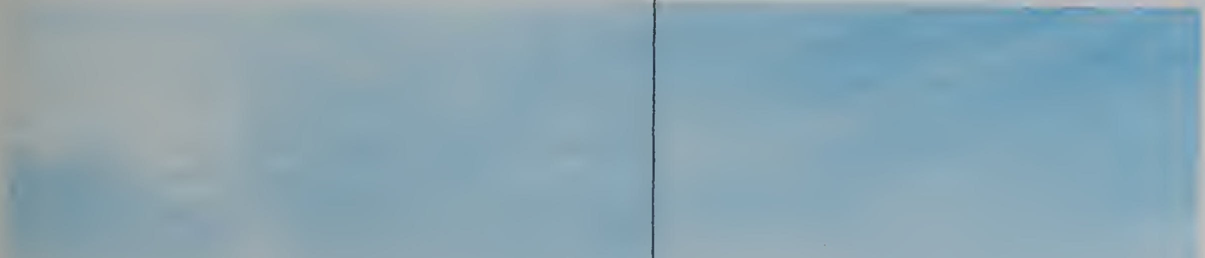
Figure 1-5



Proposed Precision Runway Monitor Site



Proposed Glide Slope Site (Viewpoint 2,

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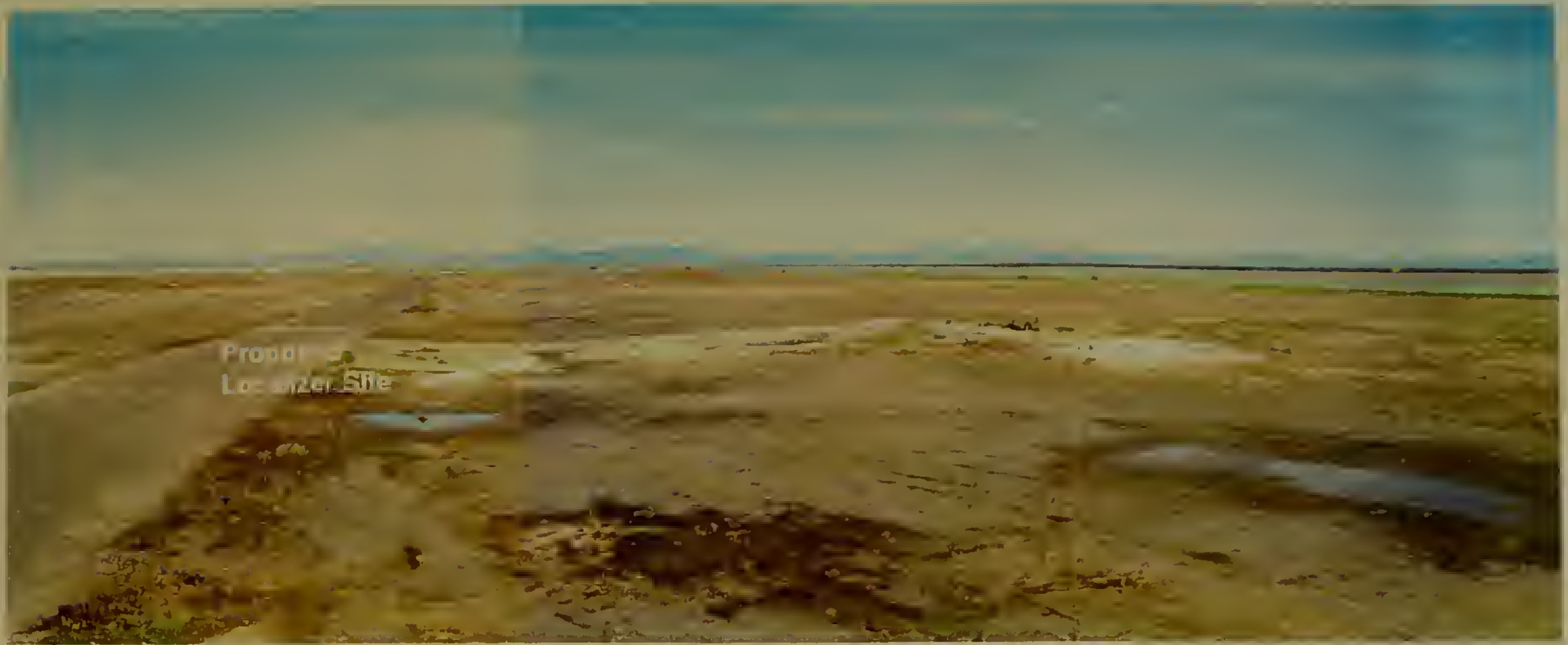
& ASSOCIATES, INC.
Figure 1-6

Site Photographs

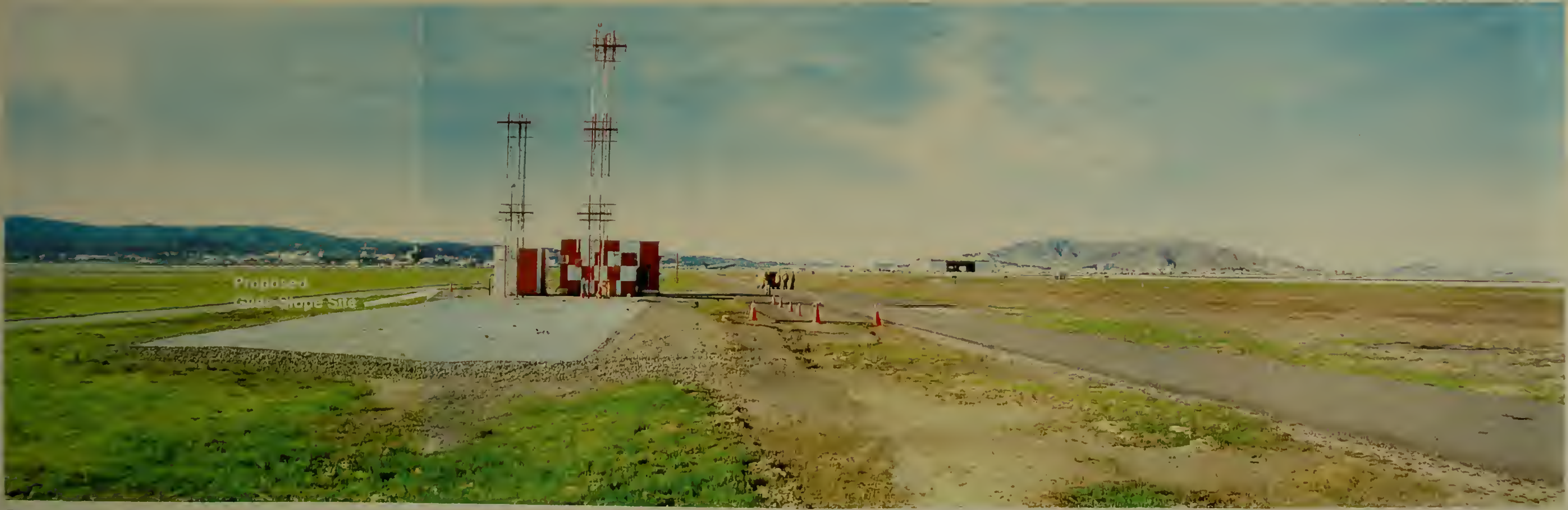
SFO
SOIA/PRM EA

File 736312\Graphics\Photos Date 3/16/2000

Proposed Precision Runway Monitor Site (Viewpoint 3, Figure 1-2)



Proposed Localizer Site (Viewpoint 1, Figure 1-2)



Proposed Glide Slope Site (Viewpoint 2, Figure 1-2)

Source: Parsons HBA

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Site Photographs

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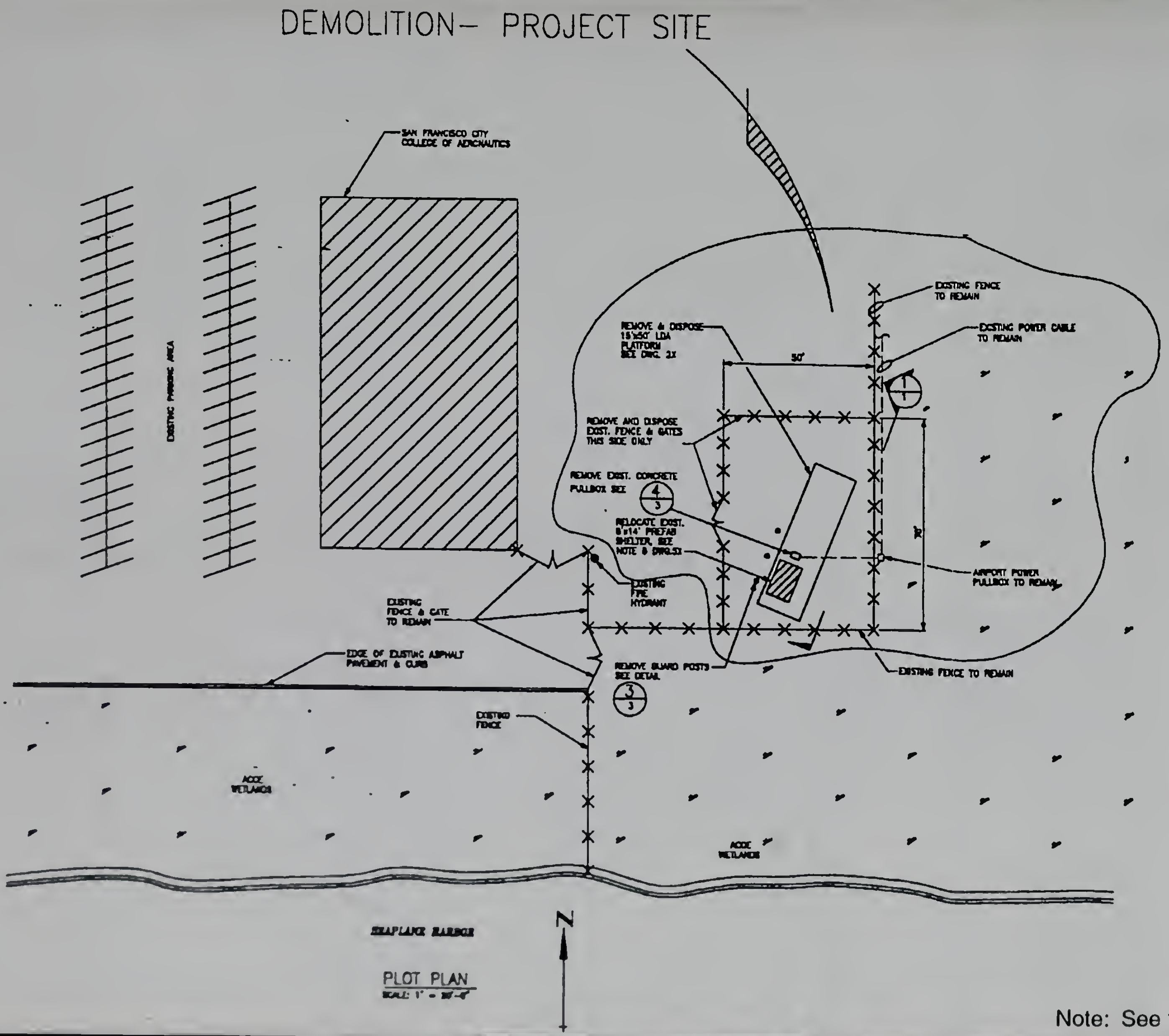
HARLAND BARTHOLOMEW
& ASSOCIATES, INC.
Figure 1-6

File: 736312\Graphics\Localizer Date: 3/14/2000


DEMOLITION– PROJECT SITE
SAN FRANCISCO CITY COLLEGE OF AERONAUTICS
EXISTING PARKING AREA
REMOVE & DISPOSE 15'x50' LDA PLATFORM SEE DWG. 2X
50'
EXISTING FENCE TO REMAIN
EXISTING POWER CABLE TO REMAIN
1/1
REMOVE AND DISPOSE EXIST. FENCE & GATES THIS SIDE ONLY
REMOVE EXIST. CONCRETE PULLBOX SEE 4/3
RELOCATE EXIST. 8'x14' PREFAB SHELTER, SEE NOTE 8 DWG.5X
70'
AIRPORT POWER PULLBOX TO REMAIN
EXISTING FIRE HYDRANT
EXISTING FENCE & GATE TO REMAIN
EDGE OF EXISTING ASPHALT PAVEMENT & CURB
REMOVE GUARD POSTS SEE DETAIL 3/3
EXISTING FENCE TO REMAIN
EXISTING FENCE
ACOE WETLANDS
ACOE WETLANDS
SEAPLANE HARBOR
N
PLOT PLAN
SCALE: 1" = 30'-0"

Source: FAA

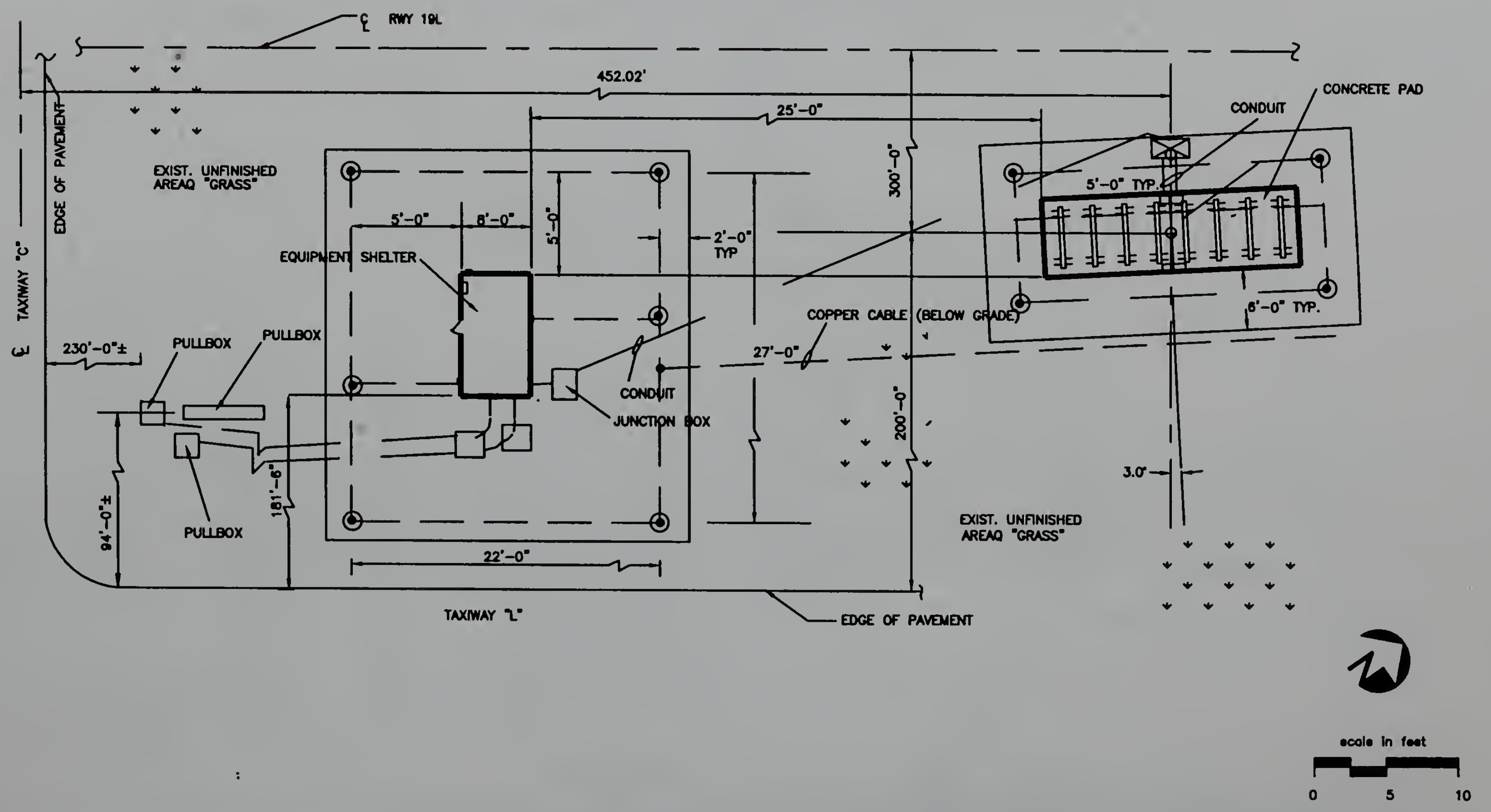
Note: See figure 1-2 for location

SFO
SOIA/PRM EA

Existing Localizer Demolition Site Plan

PARSONS
HARLAND BARTHOLOMEW & ASSOCIATES, INC.

Figure 1-7



Source: FAA

Note: See figure 1-2 for location

SFO
SOIA/PRM EA

Proposed Localizer Antenna Site Plan

PARSONS
HARLAND BARTHOLOMEW
& ASSOCIATES, INC.

Figure 1-8

In addition, a gravel access road would extend from the Localizer/DME to the nearest point of the airport perimeter road. Trenches, approximately 2 feet in width and 3.5 feet deep, would be dug using a backhoe. Trenches will be required to connect the new Localizer/DME to existing cabling infrastructure located to either the southeast or southwest of the proposed site. The Localizer/DME would be offset 3 degrees from the centerline of Runway 28R.

Best Management Practices (BMPs) would be employed during all phases of ground disturbance, not just in areas where storm water runoff could result in erosion. The purpose of employing BMPs is to reduce the possibility of soils eroding into the Bay and causing sedimentation. Spoils generated from subsurface construction activities would be disposed of by truck transport to a temporary staging area until relocation to a final controlled disposal site on Airport property.

The latitude/longitude for the relocated Localizer/DME is 37 37 18.24619N; 122 22 10.74053W.

1.8.3 Glide Slope

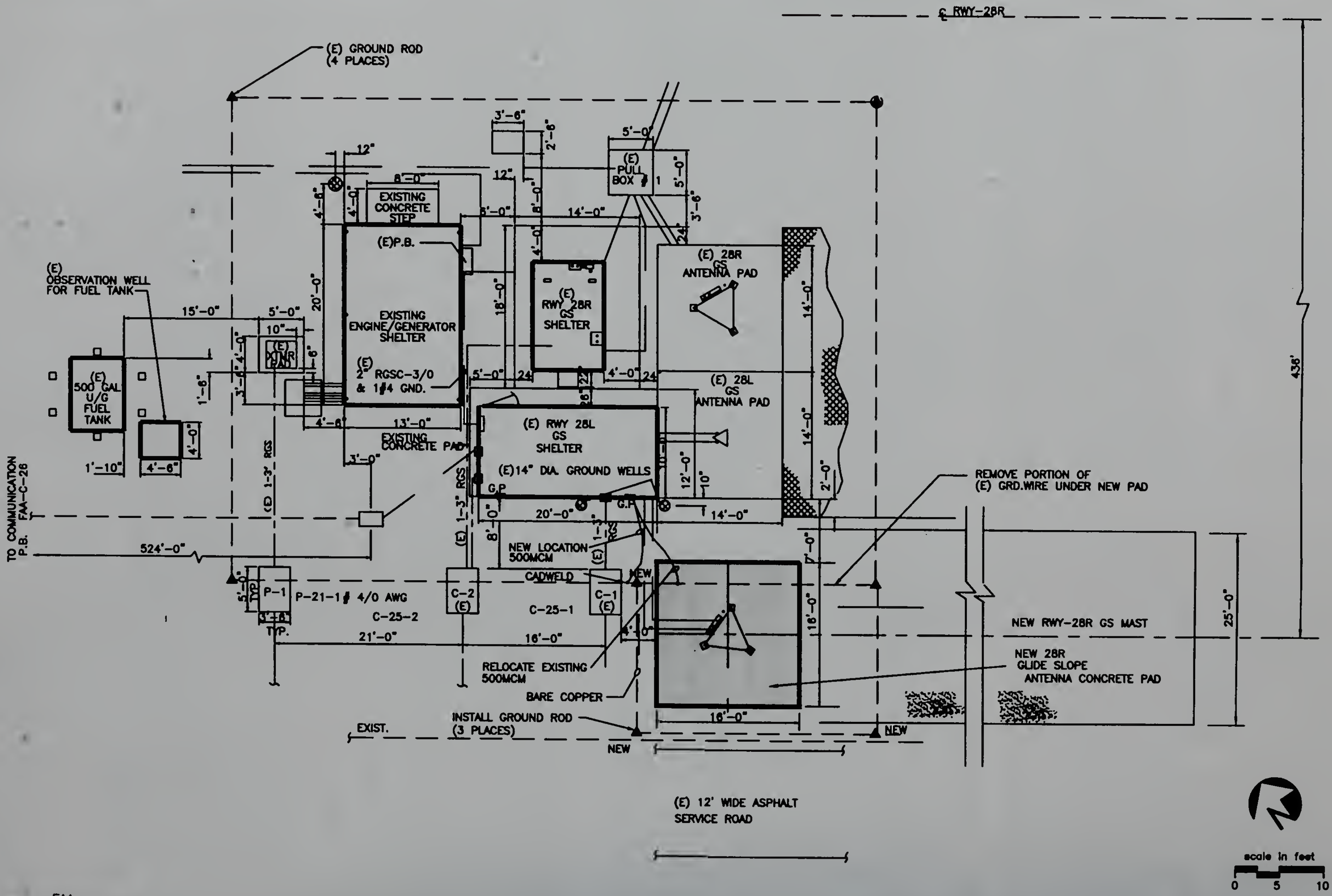
The glide slope provides vertical guidance along the descent path of the aircraft. The glide slope antenna would be approximately 50 feet tall with a triangular base of approximately 2 to 3 feet per side. The glide slope would be located approximately 480 feet from the centerline for Runway 28R and approximately 1,090 feet from the threshold of runways 28L and 28R (Figure 1-9). This site is 20 feet farther from Runway 28R than the existing glide slope antennas. A perimeter of 50 feet in width around the base footprint would be required for construction work and laydown areas creating a total area of construction disturbance of 8,408 feet. Obstruction lighting would include omnidirectional flashing and/or non-flashing aviation red obstruction beacons during the nighttime hours, and medium or high intensity flashing white obstruction lights to be used during daytime and twilight conditions. These would be mounted at the highest point of the structure, and at intermediate heights as described in the FAA Advisory Circular 70/7460-1J (DOT 1996).

Existing roads would be utilized to access the new glide slope. No new land coverage beyond the base and 50 foot perimeter would be required. Minor trenching would be required to connect the new glide slope tower with existing utilities. Trenches, approximately 2 feet in width and 3.5 feet deep, would be dug using a backhoe. Spoils generated from subsurface construction activities would be disposed of by truck transport to a temporary staging area until relocation to a final controlled disposal site on Airport property.

The latitude/longitude for the new glide slope is 37 36 50.36N; 122 21 39.91W.

1.8.4 Precision Runway Monitor

The purpose of the PRM is to monitor aircraft when conducting closely spaced independent parallel approaches. This monitoring is conducted until visual separation can be applied during periods of cloud cover between 3,500 and 1,600 feet. The PRM relates to the approach phase of flight, when aircraft landing on parallel runways are at the same altitude with relatively small lateral spacing between them. The PRM locates and displays each aircraft's position, thereby providing proper separation between aircraft on final approach to parallel runways under certain weather conditions.



Source: FAA

Proposed Glide Slope Site Plan

For the PRM display, the runway centerlines are extended along the approach path out to 15 nautical miles. A 2,000-foot wide "no transgression zone" (NTZ) is established between the extended runway final approach courses and is designated by a red border on the controller's display screen. The PRM tracks the aircraft's position, based on a one-second update rate, to provide position updates to the controllers. If an aircraft's projected track vector enters the NTZ, the aircraft's symbol and data block changes from green to yellow and an audible alert is activated. If the aircraft actually enters the NTZ, the aircraft's symbol and data block changes to flashing red. An audible alert is sounded if no prior alert was displayed.

The PRM system consists of two equipment sites (the Operations Site and the Transmitter/Receiver Site) plus two parrot (transponder) locations and cabling.

1.8.4.1 Operations Site

The Operations Site (OPS) is where the displays and display driver cabinets are located. The OPS is in an area allocated for PRM use within the FAA Airport Traffic Control (ATC) spaces (known as the IFR Room). Some of the PRM equipment is located in the Maintenance Room, while others would be installed directly into the IFR Room.

1.8.4.2 Transmitter/Receiver Site

The unmanned Transmitter/Receiver Site (T/R Site), where the radar interrogator and the electronically scanning (E-scan) antenna are located, would be positioned at the PRM tower site location at SFO (Figure 1-10). The PRM T/R Site antenna consists of a 17-foot diameter, cylindrical E-scan antenna array located on an antenna support assembly (10 feet high) on top of a standard 67-foot ASR tower. This tower has a nominal cross-section of 24 feet square and is composed of 10-foot sections topped with a 15.8-foot high platform section. The antenna array electrical center is approximately 77 feet AGL. The PRM tower structure is located 7 feet above mean sea level (MSL) with a total tower height of 81.5 feet AGL, making a maximum height for the structure of 88.5 feet above MSL. The tower foundation would be constructed with a poured concrete pad.

Obstruction lighting would include omnidirectional flashing and/or non-flashing aviation red obstruction beacons during the nighttime hours, and medium or high intensity flashing white obstruction lights to be used during daytime and twilight conditions. These would be mounted at the highest point of the structure, and at intermediate heights as described in the FAA Advisory Circular 70/7460-1J (DOT 1996).

The center point of the PRM tower is 805 feet from the centerline of Runway 1R and 1,050 feet from the centerline of Runway 28L. The Bay Conservation and Development Commission (BCDC) regulates construction activities within a 100-foot wide band along the Bay shoreline, as shown on the PRM site plan. In order to ensure that a BCDC permit is not needed for construction of the PRM tower and associated facilities, a construction activity boundary has also been delineated on the site plan. This boundary will be identified with construction fencing to ensure that BCDC lands are not disturbed.

Since the antenna is electronically steered (phased array), there is no physically rotating antenna on the tower. A shelter contains the transmitter/receiver and includes the computational equipment to track a large number of airborne targets. This shelter, located immediately west of the tower, is approximately 12 feet wide by 28 feet long by 12 feet high. PRM signals from the shelter would be routed via fiber optic cables underground to the control tower equipment room where the MCI T1 connections would be made to the operational spaces at the Bay TRACON facility. The shelter is a prefabricated building and would be set on concrete foundation piers. A stand-by emergency generator (E/G) would be installed in a slightly smaller (also prefabricated) shelter, adjacent to and north of the PRM equipment shelter, on a separate concrete pad. A concrete sidewalk would connect the two shelters on the west. A 1,000-gallon aboveground diesel fuel tank, load bank, and pad-mounted transformer would also be installed to the north of the E/G shelter. Paved and gravel surfaces would provide ground cover around the shelters and on the west side of the PRM tower.

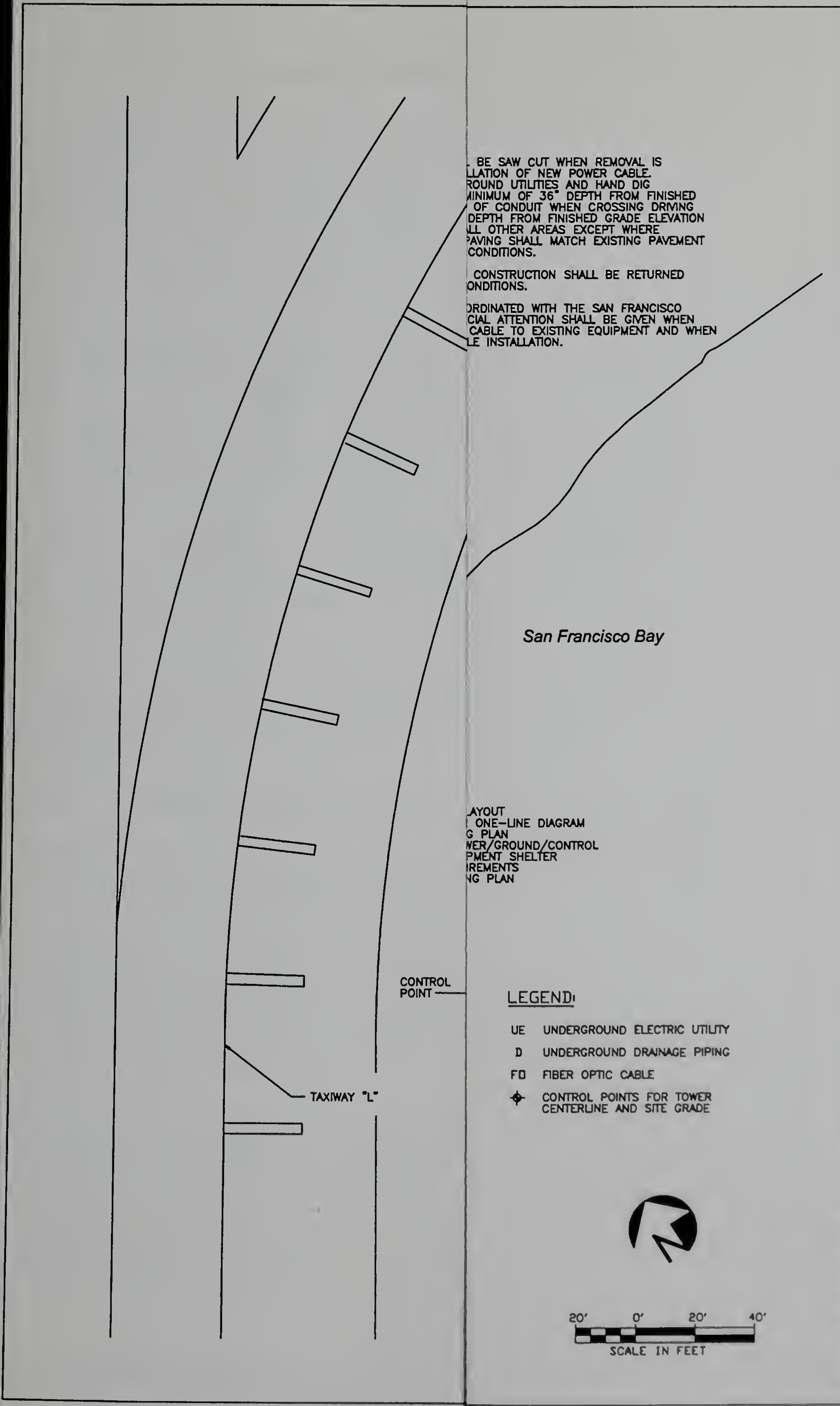
A new underground electric utility trench would be dug from the pad-mounted transformer at the PRM site east/northeast for a distance of approximately 210 feet, around the existing Field Lighting Building number 2 where it would turn west to connect with a proposed Sectionalizer Box. The trenching would continue west approximately 110 feet from the Sectionalizer Box, to connect with existing underground power utilities at Manhole PD S050. Trenches, approximately 2 feet in width and 3.5 feet deep, would be dug using a backhoe.

The latitude/longitude for the PRM transmitter/receiver is 37 36 51.85N; 122 22 21 14E.

1.8.4.3 Transponder Sites

Two parrots, which simulate fixed known aircraft locations for system monitoring, would be installed within the SFO airfield area. Each parrot is contained in a weatherproof steel enclosure. It contains a 120/24 volt AC/DC power supply, two 12-volt deep cycle batteries, and an airborne-type transponder with control head. A medium gain L-band horn antenna is mounted in a position to directly view the main E-scan antenna. Both parrots have the capability of being adjusted in range and altitude to comply with any ATC limitations.

The first parrot would be positioned on the old ATC tower cab that is located below the present ATC tower. This parrot would be located at longitude/latitude 37 37 1.3975N; 122 23 0.3972E at 140 feet MSL. The second parrot would be positioned on the Airport Surface Detection Equipment (ASDE) tower's southeast corner at 129 feet MSL, at a range of 4,228.26 feet, placing the parrot at a +0.07 degrees angle to the PRM phase center.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D UNDERGROUND DRAINAGE PIPING
FO FIBER OPTIC CABLE
⌖ CONTROL POINTS FOR TOWER CENTERLINE AND SITE GRADE
20' 0' 20' 40'
SCALE IN FEET

Source: Raytheon Systems Company

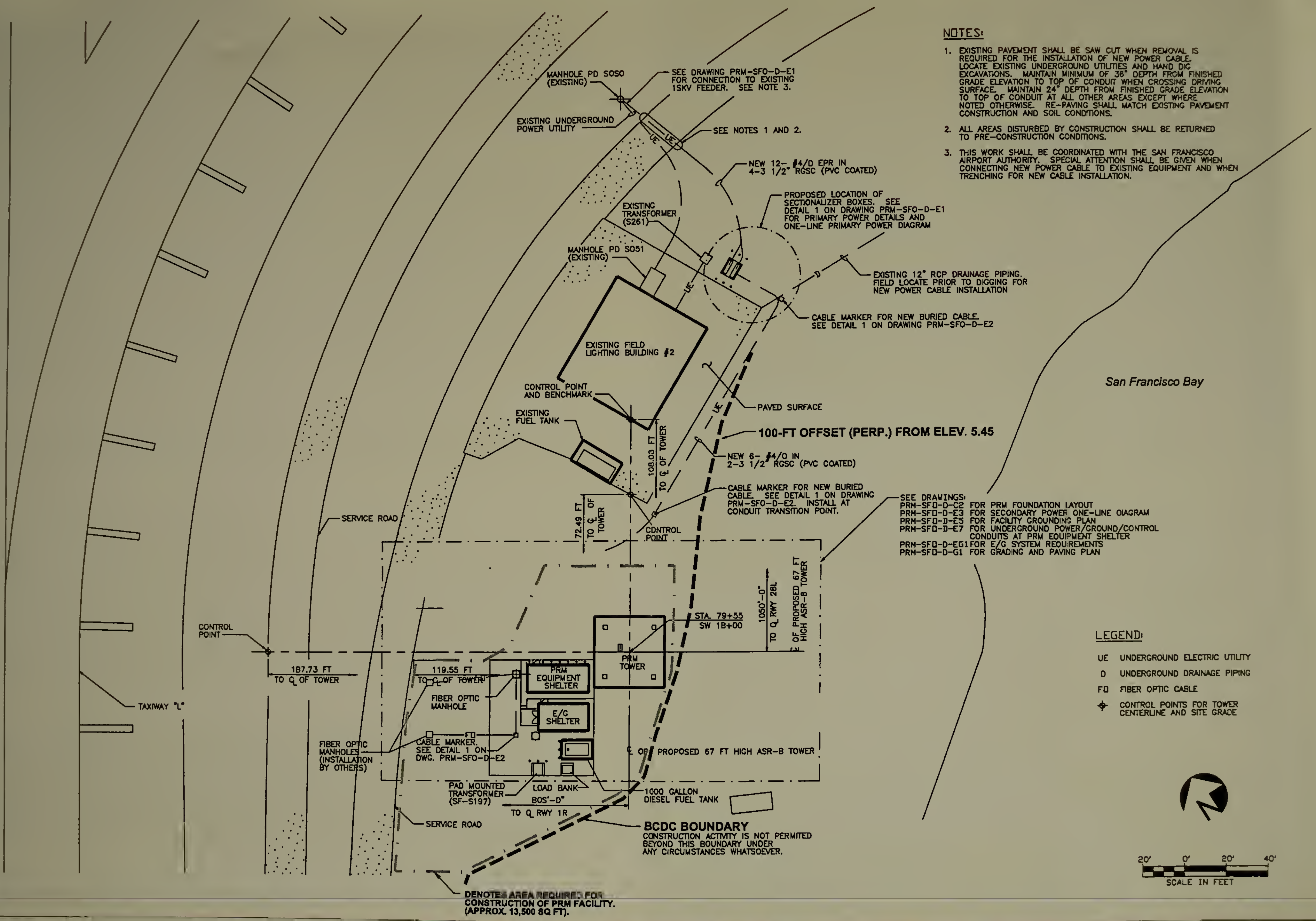
File: 736312\Graphics\PRM-Site Date: 3/16/2000

Proposed PRM Site Development Plan

Figure 1-10

PARSONS
HARLAND BARTHOLOMEW & ASSOCIATES, INC.

SFO
SOIA/PRM EA


MANHOLE PD SOSO (EXISTING)
SEE DRAWING PRM-SFO-D-E1 FOR CONNECTION TO EXISTING 15KV FEEDER. SEE NOTE 3.
EXISTING UNDERGROUND POWER UTILITY
UE
SEE NOTES 1 AND 2.
NEW 12- #4/0 EPR IN 4-3 1/2" RGSC (PVC COATED)
PROPOSED LOCATION OF SECTIONALIZER BOXES. SEE DETAIL 1 ON DRAWING PRM-SFO-D-E1 FOR PRIMARY POWER DETAILS AND ONE-LINE PRIMARY POWER DIAGRAM
EXISTING TRANSFORMER (S261)
MANHOLE PD S051 (EXISTING)
D
EXISTING 12" RCP DRAINAGE PIPING. FIELD LOCATE PRIOR TO DIGGING FOR NEW POWER CABLE INSTALLATION
CABLE MARKER FOR NEW BURIED CABLE. SEE DETAIL 1 ON DRAWING PRM-SFO-D-E2
EXISTING FIELD LIGHTING BUILDING #2
CONTROL POINT AND BENCHMARK
PAVED SURFACE
EXISTING FUEL TANK
100-FT OFFSET (PERP.) FROM ELEV. 5.45
108.03 FT TO ℄ OF TOWER
NEW 6- #4/0 IN 2-3 1/2" RGSC (PVC COATED)
CABLE MARKER FOR NEW BURIED CABLE. SEE DETAIL 1 ON DRAWING PRM-SFO-D-E2. INSTALL AT CONDUIT TRANSITION POINT.
72.49 FT TO ℄ OF TOWER
CONTROL POINT
SERVICE ROAD
San Francisco Bay
1050'-0" TO ℄ RWY 28L
℄ OF PROPOSED 67 FT HIGH ASR-8 TOWER
STA. 79+55 SW 1B+00
CONTROL POINT
187.73 FT TO ℄ OF TOWER
119.55 FT TO ℄ OF TOWER
PRM EQUIPMENT SHELTER
PRM TOWER
FIBER OPTIC MANHOLE
E/G SHELTER
TAXIWAY "L"
FIBER OPTIC MANHOLES (INSTALLATION BY OTHERS)
FO
CABLE MARKER. SEE DETAIL 1 ON DWG. PRM-SFO-D-E2
℄ OF PROPOSED 67 FT HIGH ASR-8 TOWER
PAD MOUNTED TRANSFORMER (SF-S197)
LOAD BANK
805'-0" TO ℄ RWY 1R
1000 GALLON DIESEL FUEL TANK
SERVICE ROAD
BCDC BOUNDARY
CONSTRUCTION ACTIVITY IS NOT PERMITED BEYOND THIS BOUNDARY UNDER ANY CIRCUMSTANCES WHATSOEVER.
DENOTES AREA REQUIRED FOR CONSTRUCTION OF PRM FACILITY. (APPROX. 13,500 SQ FT).
20' 0' 20' 40'
SCALE IN FEET

NOTES:

1. EXISTING PAVEMENT SHALL BE SAW CUT WHEN REMOVAL IS REQUIRED FOR THE INSTALLATION OF NEW POWER CABLE. LOCATE EXISTING UNDERGROUND UTILITIES AND HAND DIG EXCAVATIONS. MAINTAIN MINIMUM OF 36" DEPTH FROM FINISHED GRADE ELEVATION TO TOP OF CONDUIT WHEN CROSSING DRIVING SURFACE. MAINTAIN 24" DEPTH FROM FINISHED GRADE ELEVATION TO TOP OF CONDUIT AT ALL OTHER AREAS EXCEPT WHERE NOTED OTHERWISE. RE-PAVING SHALL MATCH EXISTING PAVEMENT CONSTRUCTION AND SOIL CONDITIONS.
2. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE RETURNED TO PRE-CONSTRUCTION CONDITIONS.
3. THIS WORK SHALL BE COORDINATED WITH THE SAN FRANCISCO AIRPORT AUTHORITY. SPECIAL ATTENTION SHALL BE GIVEN WHEN CONNECTING NEW POWER CABLE TO EXISTING EQUIPMENT AND WHEN TRENCHING FOR NEW CABLE INSTALLATION.

SEE DRAWINGS:

PRM-SFO-D-C2	FOR PRM FOUNDATION LAYOUT
PRM-SFO-D-E3	FOR SECONDARY POWER ONE-LINE DIAGRAM
PRM-SFO-D-E5	FOR FACILITY GROUNDING PLAN
PRM-SFO-D-E7	FOR UNDERGROUND POWER/GROUND/CONTROL CONDUITS AT PRM EQUIPMENT SHELTER
PRM-SFO-D-EG1	FOR E/G SYSTEM REQUIREMENTS
PRM-SFO-D-G1	FOR GRADING AND PAVING PLAN

LEGEND:

UE	UNDERGROUND ELECTRIC UTILITY
D	UNDERGROUND DRAINAGE PIPING
FO	FIBER OPTIC CABLE
⌖	CONTROL POINTS FOR TOWER CENTERLINE AND SITE GRADE

Source: Raytheon Systems Company

SFO
SOIA/PRM EA

Proposed PRM Site Development Plan

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& ASSOCIATES, INC.

Figure 1-10

1.8.5 Simultaneous Offset Instrument Approach

When weather conditions at SFO allow, aircraft approach in two parallel streams of traffic for approximately 60 landings per hour on runways 28L and 28R. Under current operating procedures for reduced visibility weather conditions (i.e., when cloud cover is between 3,500 feet and 1,600 feet, which occurs about 7.5 percent of the time), aircraft approach in a single stream of traffic, reducing this number to approximately 30 landings per hour which results in aircraft delay. While decreasing delays in landing experienced during certain poor weather conditions, SOIA would not increase the overall capacity of the runway system.

The purpose of the new SOIA procedure and the ILS/PRM is to reduce the number of delays under IFR conditions. The proposed SOIA approach and feeder route modifications shown on Figure 1-4 would permanently replace existing approach and feeder routes that are currently in use for runways 28L and 28R. These modifications include a new arrival route from the east that will address potential "wake turbulence" restrictions proposed for the SOIA participating aircraft. Upon implementation, the proposed Project is estimated to reduce the number of delays on runways 28L and 28R, when cloud cover is between 3,500 feet and 1,600 feet and visibility is greater than four miles. This reduction is accomplished by providing an increased lateral separation between aircraft via the Runway 28R offset approach track and through a more efficient design of the feeder route system in the Bay Area. During better weather conditions, the SOIA arrival tracks and feeder routes will also be used because of their improvements to overall traffic efficiency.

The operations at the Bay TRACON facility provides air traffic control for aircraft nearing final approach and/or soon after departure from area airports. The Bay TRACON operation serves the three primary airports in the region: SFO, Oakland International Airport, and San Jose International Airport.

1.8.6 Existing Aviation Operations

Passenger activity at SFO has increased steadily from approximately 31 million passengers in 1990 to 40 million in 1998 (SFO Master Planning Office 2000). Growth in cargo activity has also increased steadily. In 1990, approximately 450,000 tons of total cargo passed through SFO and by 1998, this figure had reached 771,000 tons. The most significant change at SFO in recent years has been the growth in international passengers and cargo. From 1990 to 1996, international passengers increased by over 60 percent and international cargo by 54 percent. Levels peaked in 1997 with more than seven million international passengers and 370,000 tons of international cargo, before declining slightly in 1998. Table 1-1 documents passenger and cargo activity from 1996 to 1998.

Growth in total aircraft operations was relatively flat through the 1990s in contrast to the growth in passengers and freight (SFO Master Plan EA 1998). Growth for air carrier operations is substantially less than that for passenger and cargo activity, due to the change in aircraft fleet mix and the increase in load factors for air carrier aircraft. Recent growth trends at SFO have indicated a shift to a larger average-size aircraft (for example, fewer DC-9s and B-727s and more B-747s and B-757s). Since 1990, there has been little overall change in air taxi operations (i.e., commuter service), a reduction in civil operations (i.e., general aviation), and a consistently low number of military operations at SFO. Table 1-2 documents historic aircraft operations at SFO from 1996 to 1998.

Table 1-1

Historic Passenger and Cargo Activity

	1996	1997	1998
Domestic Passengers*	39,251,289	40,493,959	40,066,326
International Passengers*	6,587,754	7,013,552	6,698,270
Cargo**	564,285.7	780,045.0	771,930.3
International Cargo**	338,393.1	370,077.3	353,837.1

Source: SFO Master Planning Office 2000

* Total Airport Passengers include enplaned and deplaned passengers who fly into and out of SFO on the same aircraft.
** Metric tons, includes mail.

Table 1-2

Historic Aircraft Operations

	1996	1997	1998
Aircraft Operations	427,449	437,055	432,046
Air Taxi Operations	73,076	74,434	71,752
Civil Operations	26,588	26,977	25,408
Military Operations	2,604	2,694	2,683

Source: SFO Master Planning Office 2000

It is important to note the high peaking characteristics of passenger and aircraft operations at SFO (SFO Master Plan EA 1998). Much of this peaking activity (particularly international service) occurs between 9:00 a.m. and 3:00 p.m., with an additional peak for domestic flights occurring during 9:00 p.m. to 10:00 p.m. Midday international peaking is caused primarily by the need for airlines to schedule long-haul international flights into and out of the SFO during specific time periods. International flights are scheduled during these times to allow passenger arrivals and departures to occur at reasonable times at both ends of the journey. Additionally, some overseas airports have operational curfews that also require the flights to occur at SFO during the midday hours.

1.8.7 Future Aviation Operations

The FAA forecasts the level of aviation activity at most major airports nationwide (SFO Master Plan EA 1998). Growth factors for these forecasts are developed through the use of a terminal area forecast data base applied to individual airports. At some airports, the forecasts are modified to reflect forecasts for major hubs. The hub forecasts are developed using trend analysis, characteristics of activity at each airport within the hub, as well as socioeconomic trends and forecasts.

Over the past 25 years, SFO has experienced a steady growth in aviation activity (SFO Master Plan EA 1998). That growth is projected to continue well into the next century. A number of region-wide aviation studies have been prepared in recent years to document growth projections.

The California Aviation System Plan (CASP), prepared in 1989 by the California Department of Transportation (Caltrans), identified activity projections for the entire California aviation system and incorporated aviation forecasts for activity at SFO (SFO Master Plan EA 1998). The CASP predicted strong growth in passenger activity in the earlier years of the forecast period, with the rate of growth falling off in the later years. Even with the projected decline in growth rate, the CASP forecast projected one of the highest passenger levels of any of the projections developed for SFO. Based on the CASP, the total annual passenger level at SFO was projected to reach 37.9 million in 1995 and grow to 51.2 million total annual passengers by the year 2005.

The most recent Terminal Area Forecast (TAF) produced by the FAA for SFO was prepared in October 1997 (SFO Master Plan EA 1998). This forecast projected annual enplanements for the period of 1997 to 2010. Total annual passengers were projected at approximately 38.9 million in 1997 and were expected to grow to an estimated 54.7 million by the year 2005; ultimately to reach 60.7 million by 2010.

In 1994, the Metropolitan Transportation Commission (MTC) conducted an update to its aviation passenger traffic forecast for the entire Bay Area (SFO Master Plan EA 1998). The MTC developed both high- and low-range projections of total annual regional passengers and total annual passengers for each commercial airport within the Bay Area. Total annual high-range passenger levels at SFO are projected to increase from an estimated 46 million in 1996 to 52.8 million in 2005 and could reach 59.9 million by 2010. Low-range projections show total annual passengers growing from 34.1 million in 1995 to just under 44.0 million in 2005 and reaching 49.9 million by 2010.

Each of these regional forecasts project passenger activity at SFO at 50,000,000 passengers or more by the year 2006 (SFO Master Plan EA 1998). By the end of 1996, the total annual passenger level at SFO was in excess of 39,000,000, a figure higher than any of the regional forecasts through that same time period.

1.8.8 Construction Phasing

Construction activities would last 35 to 45 days for the glide slope and Localizer/DME and approximately four months for the PRM. Each site would need a backhoe for the duration of construction. The PRM site would also require the use of heavier equipment for tower foundation grading. During construction of each facility, a crane would be needed on site for approximately two days. Staging and parking areas would be located on the airfield, west of the Field Lighting No. 2 area. Construction equipment would be stored on Airport property (outside flight line setbacks, etc.) and would not need to access the Airport via the road network on a daily basis.

Three to four pickup trucks per site for construction personnel and engineers would be required. These vehicles would access the Airport each day for the duration of construction activities.

Construction of the Localizer/DME and glide slope components would be completed by September 2000 (dependent upon approval of the EA in late June). Construction of the PRM is scheduled to begin at the beginning of July 2000 (dependent upon approval of the EA) and end approximately four months later.

SFO is currently in the process of completing the Fiber Optic Loop Upgrade Project which is unrelated to this Project. The Fiber Optic Project would provide tie-ins to the proposed PRM site as well as to the existing glide slope area. Pull-boxes and cable trenches installed as part of the Fiber Optic Project would be utilized where appropriate for this Project to reduce the extent of new ground disturbance.

1.9 PUBLIC INVOLVEMENT

As a public outreach effort, close to 100 public agencies and officials, representing federal, state, regional, and local interests, received a scoping memo entitled "Notice of the Proposed Action and Preparation of Environmental Assessment for Simultaneous Offset Instrument Approach (SOIA)/Precision Runway Monitor (PRM) Project" and were asked to comment. A copy of the Scoping Memo and EA distribution list is provided in Appendix C. Comments received on the Scoping Memo have been addressed in the EA and are included in Appendix D. The circulation of the Draft EA will be followed by the preparation of a Final document that responds to comments received. During public circulation of the Draft EA, a public information meetings will be held to receive comments on the Proposed Action. The meetings will be held at the San Mateo Council Chambers on April 19, 2000 and April 20, 2000 at 7:00 p.m. The San Mateo Council Chambers are located in the San Mateo City Hall building at 330 W. 20th Avenue, San Mateo, CA.

1.10 TIME FRAME

The SOIA development program was implemented in July of 1999, commencing with the equipment site selection and a preliminary environmental analysis. Estimated operational readiness is scheduled for June 2001.

CHAPTER 2
ALTERNATIVES

In accordance with 40 CFR 1502.14, alternatives to the Proposed Action, including the No Action alternative, are identified and evaluated. In addition, for alternatives eliminated from further study, the reasons for their elimination are presented in this section.

2.1 ALTERNATIVE 1: PROPOSED ACTION

This alternative (the "Project") calls for the implementation of a SOIA arrival track and modifications to feeder routes at SFO Runways 28L and 28R. The SOIA operation will reduce delays during periods of cloud cover between 3,500 and 1,600 feet, which occurs about 7.5 percent of the time. A detailed explanation of the Project components can be found in Section 1.8. Incorporation of the PRM radar system would increase tracking of aircraft during the approach phase as a result of the use of an electronically steered antenna as opposed to the mechanical steered antenna currently in use. The PRM system, if approved, will improve accuracy by increasing update rates allowing approaching aircraft to be more closely supervised by ATC, and thus decreasing the number of delays during periods of inclement weather.

While the PRM is primarily for use under IFR conditions, commercial aircraft frequently utilize IFR even when VFR conditions prevail. The use of the PRM during reduced visibility conditions will increase the efficiency and decrease overall delays for flights arriving on runways 28R and 28L.

2.2 ALTERNATIVE 2: NO ACTION

The efficiency of the existing primary radar system is limited by the rotation rate of the mechanically rotated antenna. The No Action alternative would maintain the limitations of the current ATC radar update rate and display resolutions. Under this alternative, there would be no installation of equipment, no changes in airspace or procedures, and no gains in throughput efficiency during certain periods of inclement weather.

If the Project is not implemented, and operational levels at SFO increase in the future as projected, the impact of delays attributable to inclement weather conditions and the subsequent single stream arrival path procedure may become more pronounced. Given SFOs current national standing as the most impacted airport in terms of delays, more delays could ultimately have economic repercussions for the Bay Area as travelers and cargo shippers choose to go elsewhere rather than risk delays at SFO.

2.3 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

In addition to the Proposed Action and No Action alternatives described above and analyzed in this EA, a number of other project alternatives were initially developed during the planning process. These alternatives primarily addressed different site locations for the ground based navigational equipment, specifically the Localizer/DME and glide slope components.

FAA Advisory Circular 150/5300-13, *Airport Design*, provides general siting requirements for navigational aids at airports. These criteria ensure that the equipment is optimally sited in terms of physical locations and performance potential (equipment could be susceptible to signal interference from buildings, fences, intervening terrain, etc.). Another siting constraint in terms of locating navigational aids in the airfield environment is the proximity of these above-ground structures to runways and taxiways. Federal Aviation Regulations (FAR) Part 77, *Objects Affecting Navigable Airspace*, specifies the setback criteria necessary for siting structures of a certain height on the airport.

The FAA looked at a number of alternative site locations for the off-set Localizer/DME and the glide slope. A few of the sites that initially met performance requirements were dropped from further consideration due to their proximity to either adjacent runways or taxiways. Given the small footprints associated with each of the navigational aids and the lack of sensitive resources in most sites located adjacent to the airfield, none of the proposed or eliminated equipment sites offered a clear preference in terms of potential environmental impacts. Since these alternative locations offered no advantages environmentally, and resulted in potential airspace obstruction, only the preferred off-set Localizer/DME and glide slope sites were selected for further consideration.

For these reasons, only the Proposed Action and No Action alternatives will be carried forward for subsequent detailed environmental analysis in this EA.

2.4 ALTERNATIVES COMPARISON

There would be no environmental impacts associated with the No Action alternative because there would be no changes from existing conditions. However, during certain weather conditions, existing levels of aircraft delay would continue.

The Proposed Action alternative would result in several potential impacts that require the implementation of various mitigation measures. With the implementation of the recommended mitigation measures, each potential impact would be further reduced. A summary of the potential impacts follows:

- Short-term air quality effects associated with construction, including fugitive dust and construction equipment emissions. Both effects would be reduced by implementing standard construction-related guidelines.
- Increased erosion from soils disturbed during construction. Sediments released from disturbed soils during storm events could impact adjacent surface waters (San Francisco Bay). This potential effect would be reduced to a less than significant level by implementing standard erosion control measures both during (temporary – i.e. siltation fencing) and following construction (permanent – i.e. revegetation).
- Congestion as a result of construction-related truck traffic. During construction, truck traffic may result in the lessening of capacity on access streets and haul routes due to the slower movements and larger turning radii of construction vehicles. This potential effect

would be reduced by implementing a plan to transport heavy equipment to the site at the beginning and end of the construction period to minimize impacts to peak hour traffic.

- Disturbance of subsurface archaeological or historic remains. During excavation, the possibility (considered very slight) exists that archaeological resources or human remains could be uncovered. This potential effect would be reduced to a less than significant level by immediately stopping work in the event of a discovery and contacting a qualified archaeologist or the San Francisco County coroner's office to investigate the find.
- Disturbance of mapped wetlands during construction of the PRM. The location of the PRM is adjacent to mapped wetland habitat. Potential construction-related disturbance of this habitat would require a permit from either the U.S. Army Corps of Engineers or BCDC. However, this potential effect would be reduced to a less than significant level by implementing a program to delineate the PRM construction boundary and protect the wetland habitat.

CHAPTER 3

AFFECTED ENVIRONMENT

Pursuant to FAA Order 1050.1D, Chapter 6, Paragraph 65, *Affected Environment*, this Chapter describes the existing (affected) environment for each impact category. The purpose of this chapter is to identify or highlight any important background material that may help to explain the present conditions within the vicinity of the project components included in the Proposed Action.

3.1 NOISE

3.1.1 RUNWAY ORIENTATION AND USE

SFO currently operates two pairs of intersecting parallel runways: an east-west pair (i.e., 10L-28R and 10R-28L), and a north-south pair (i.e., 1L-19R and 1R-19L). Three runway use configurations account for the majority of all operations at the Airport: 1) West Plan - arrivals to runways 28L and 28R, departures from runways 1L and 1R, 2) Southeast Plan - arrivals to runways 19L and 19R, departures from runways 10L and 10R and 3) All West Plan - both arrivals to and departures from runways 28L and 28R.

The amount of time that each runway configuration is used is determined by the weather (i.e., wind, cloud ceiling, and visibility conditions) at the Airport. The percent of time that arrivals occur on the Runway 28 system, and the percent of time that weather conditions permit side-by-side (i.e., dual) arrivals on runways 28R and 28L are of particular interest to this study because these two runways account for approximately 93 percent of all arrivals to SFO and 10 percent of all departures.

To determine the percentage of time that weather conditions permit side-by-side operations, an analysis of weather data from the National Climatic Data Center was performed. Currently, for aircraft landing on runways 28L or 28R, side-by-side visual operations occur when cloud ceilings are 3,500 feet or greater and visibility is four miles or more. When weather ceilings are reported to be less than 3,500 feet and/or visibility is less than four miles, single stream operations are used. The new SOIA procedure would allow side-by-side instrument operations to occur when cloud ceilings exist between 1,600 feet and 3,500 feet. Table 3.1-1 shows that the amount of time this condition exists is approx. 7.5 percent of the year.

3.1.2 EXISTING NOISE MITIGATION MEASURES

Over the past decade, SFO has established an agreement with the FAA, in cooperation with the Airport/Community Roundtable, for noise mitigating measures designed to minimize noise impacts from aircraft over the surrounding communities. The runway use program attempts to minimize noise over populated areas by, among other measures, operating over San Francisco Bay and avoiding over-flights of residential areas as much as possible. Today, approximately 99 percent of all arrivals and approximately 83 percent of all departures occur over the water.

Table 3.1-1

Percent Occurrence of Weather Conditions in which the Proposed SOIA Procedure Would Allow Side-by-Side Arrivals to Runways 28L and 28R

Hour	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual Average
7:00 AM	12.9%	12.7%	15.5%	12.0%	13.9%	6.7%	3.6%	7.4%	7.3%	7.8%	7.4%	8.4%	9.6%
8:00 AM	10.7%	11.3%	14.2%	10.3%	14.8%	8.3%	4.5%	9.7%	8.3%	8.7%	7.0%	9.4%	9.8%
9:00 AM	10.3%	12.0%	18.1%	13.7%	16.1%	9.0%	8.1%	9.7%	9.0%	8.1%	8.0%	7.7%	10.8%
10:00 AM	9.0%	13.1%	14.9%	14.0%	14.5%	8.0%	5.2%	7.5%	9.7%	9.4%	9.0%	7.1%	10.1%
11:00 AM	11.0%	15.2%	15.2%	15.7%	10.0%	7.0%	2.9%	7.1%	6.7%	9.7%	10.4%	11.0%	10.1%
12:00 PM	10.7%	11.0%	14.8%	14.7%	8.7%	4.3%	1.6%	5.5%	4.3%	8.7%	11.4%	10.3%	8.8%
1:00 PM	14.2%	12.0%	12.9%	10.3%	7.1%	4.3%	0.7%	4.5%	4.3%	7.1%	9.7%	10.7%	8.1%
2:00 PM	13.2%	13.8%	11.0%	10.0%	8.4%	4.7%	0.7%	3.6%	3.7%	4.2%	7.0%	7.8%	7.3%
3:00 PM	12.9%	12.4%	11.0%	8.0%	7.4%	4.3%	0.3%	3.9%	1.7%	4.8%	5.0%	6.8%	6.5%
4:00 PM	12.3%	11.3%	11.3%	6.7%	8.1%	5.0%	0.3%	1.9%	2.7%	4.9%	7.0%	8.4%	6.6%
5:00 PM	12.3%	11.3%	8.4%	5.3%	7.7%	3.0%	0.7%	1.9%	1.7%	3.9%	5.3%	9.4%	5.9%
6:00 PM	10.3%	8.8%	8.4%	6.0%	7.4%	2.3%	0.7%	1.0%	1.7%	3.2%	4.7%	9.7%	5.3%
7:00 PM	7.8%	11.7%	8.7%	5.0%	6.5%	3.0%	1.6%	1.6%	1.7%	1.6%	4.0%	5.8%	4.9%
8:00 PM	9.0%	10.6%	8.7%	6.3%	8.1%	3.0%	1.0%	2.6%	1.3%	2.3%	5.0%	7.7%	5.5%
9:00 PM	7.1%	10.6%	9.4%	7.0%	8.1%	3.7%	1.3%	2.6%	0.7%	2.6%	4.0%	7.1%	5.3%
10:00 PM	9.4%	11.0%	7.7%	6.7%	9.7%	5.0%	1.6%	3.6%	1.7%	3.6%	3.7%	6.1%	5.8%
Average	10.8%	11.8%	11.9%	9.5%	9.8%	5.1%	2.2%	4.6%	4.1%	5.7%	6.8%	8.3%	7.5%

Source: AvAirPros, December 1999, based on data obtained from the National Climatic Data Center for the period January 1, 1988 through December 31, 1997.

Note: Weather percentages shown indicate the amount of time when (1) cloud ceilings are lower than 3,500 feet but higher than 1,600 feet, and (2) visibility is at least four miles. It is assumed that SOIA procedure would be used in these weather conditions.

3.2 COMPATIBLE LAND USE

The proposed ILS and PRM system would be located within the boundaries of the existing Airport. No changes in the land use relationships between on-Airport property and adjacent land uses would occur. Changes in flight-tracks associated with the SOIA procedure would occur above 3,000 feet AGL and are thus excluded from environmental processing pursuant to FAA Order 1050.1D, Appendix 4, Chapter 4, Section K. A majority of the approach track and feeder route changes would occur at altitudes above 6,000 feet AGL, including all of the modifications to aircraft feeder routes described below, and at the point where aircraft would enter the final approach tracks for SOIA (approximately 19 miles out from SFO).

However, flight track changes associated with the implementation of the new SOIA procedure could result in perceived impacts from overhead flights crossing areas where they did not exist previously. Figure 1-3 (Chapter 1) shows the proposed flight paths and new land areas that would potentially be affected by this Project. Appendix E provides a detailed description of the land uses and facilities that would be over-flown by aircraft using feeder routes outlined in the Proposed Action. Most of these lands uses are not currently over-flown by aircraft using the No Action feeder routes. The five modified feeder routes include:

1. **Golden Gate STAR (south over-flight/approach)** The Golden Gate STAR brings aircraft into the San Francisco Bay area from the north at approximately 11,000 feet AGL. Near the Golden Gate Park, aircraft are vectored either down the peninsula or over the San Francisco Bay and onto final approach for runways 28R and 28L. The more southerly of the Proposed Action over-flight/approach vectors would cross over SFO and down the peninsula as currently mapped. However, near Redwood City, this modified feeder route would continue southeast rather than turning north onto final approach. At this point, aircraft flying this modified feeder route would cross over the cities of Woodside, Portola Valley, Sunnyvale, Cupertino, Santa Clara, San Jose, Milpitas, and other unincorporated areas of San Mateo and Santa Clara counties. In addition, over-flights would occur in airspace above the Windy Hill Open Space (OS) Preserve, Los Trancos OS, Coal Creek OS, Russian Ridge OS, Coyote Creek Corridor, Monte Bello OS, Rancho San Antonio OS, and the Don Edwards San Francisco Bay Wildlife Refuge.

   Land uses under the modified feeder route would include agricultural (dairying, grazing and farming), aviation, industrial and light manufacturing, maritime shipping and marine, public recreation (including county regional wilderness parks, federal parks, and wildlife refuges), public transportation, urban commercial and residential, and water management.

2. Golden Gate STAR (north over-flight/approach)

The more northerly of the Proposed Action over-flight/approach vectors would cross over San Francisco and Daly City and down the San Francisco Bay as currently mapped. However, near the eastern span of the San Mateo Bridge, this modified feeder route would continue east rather than turning south and onto final approach. At this point, aircraft flying this modified feeder route would cross over the cities of Fremont, Hayward, Union City, Newark, and unincorporated areas of Alameda County.

Over-flights would occur in the airspace above the Don Edwards San Francisco National Wildlife Refuge, Hayward Regional Shoreline, Ohlone Regional Wilderness, and Pleasanton Ridge Regional Park.

Land uses under the modified feeder route would include agriculture (dairying, grazing, and crops), aviation, national defense, industrial and light manufacturing, maritime shipping and marine, public recreation (including county regional wilderness parks and a federal wildlife refuge), public transportation, urban commercial and residential, and water management (Calaveras and San Antonio Reservoirs).

3. Big Sur STAR

The modified Big Sur feeder route would enter the Bay Area airspace along its existing routing at approximately 16,000 feet AGL, descending to 10,000 feet. However, just south of the Santa Cruz Mountains, this feeder route would turn slightly to the north and over fly the cities of Los Gatos, Campbell, Santa Clara and San Jose, and other unincorporated areas of Santa Clara and Santa Cruz counties. In addition, over-flights would occur in airspace over Quail Hollow Ranch County Park, Lexington Reservoir County Park, Mid-Peninsula OS, Coyote Creek Corridor, and Don Edwards San Francisco Bay Wildlife Refuge.

Land uses under the modified feeder route would include agriculture (dairying, forestry, grazing and crops), aviation, national defense, industrial and light manufacturing, mining, public recreation (including county regional wilderness parks and a federal wildlife refuge), public transportation, urban commercial and residential, and water management (Lexington Reservoir).

4. Modesto Arrivals

The modified Modesto feeder route would enter the Bay Area airspace at approximately 15,000 feet AGL, descending to 11,000 feet. The Proposed Action would include the creation of a new parallel route approximately 7 miles south/southeast of the existing route. Aircraft using these feeder routes would over fly the cities of Fremont and Newark and other unincorporated areas of Alameda and Santa Clara Counties. Aircraft using the existing feeder route would not impact any new communities. However, aircraft using the new parallel feeder route would over fly areas of unincorporated Santa Clara County and east San Jose that were previously not overflown by SFO aircraft.

5. Oceanic Arrivals

The modified Oceanic feeder route would enter the Bay Area airspace at level flight of approximately 8,000 feet AGL at the existing location near the Pescadero State Beach. At this point, aircraft using this feeder route would turn to the east and fly over unincorporated San Mateo and Santa Clara counties, and the cities of Saratoga, Cupertino, Santa Clara and San Jose. Near Sunnyvale, aircraft using this feeder route would merge with the modified Golden Gate and Big Sur feeder routes that are described above.

Overflights would occur in airspace above the Coyote Creek corridor, Fremont Older OS, Picchetti Ranch OS, Saratoga Gap OS, Long Ridge OS, and Stevens Creek County Park.

Land uses under the modified feeder route would include agriculture (grazing, forestry, and crops), industrial and light manufacturing, mining, public recreation (including county regional wilderness parks and a State park), public transportation, urban commercial and residential, and water management (Stevens Creek reservoir).

3.3 SOCIAL

3.3.1 EMPLOYMENT

Approximately 32,000 people are employed due to SFO activities and operations. This represents approximately 10 percent of the jobs in San Mateo County. Seventy-four percent of these employees work in the airline sector; other sectors include government agencies (6 percent), concessionaires and caterers (6 percent), general aviation and services (3 percent), freight (5 percent) and ground transportation (5 percent), and hotels (1 percent).

The majority of employees work on-site. Some employees spend only a portion of their work day on-site; they include airline flight crew, who begin and end their work day at the Airport, and ground transportation, such as taxi and van drivers who transport passengers to and from the Airport. Other employees spend all of their work day off-site; they include airline ticketing personnel who work in downtown San Francisco.

Almost half (47 percent) of the employees at SFO live in San Mateo County. Other common residences include San Francisco (17 percent) and Alameda (15 percent). San Mateo County has a total population of about 737,100 (Association of Bay Area Governments [ABAG] Projections 2000) and a jobs-housing balance of 0.52. This means that there are 0.52 jobs for every resident.

3.3.2 TRANSPORTATION

Regional access to SFO is provided primarily by U.S. 101, a north-south freeway. Other freeways serving SFO are Interstate 380 (I-380), a six-lane east-west freeway, which connects I-280 to the west of U.S. 101. In the vicinity of SFO, U.S. 101 is an eight-lane, north-south freeway with four interchanges (Millbrae Avenue, SFO Terminal, San Bruno Avenue, and I-380/North Access Road). As a result of several planned improvements under the SFO Master Plan, circulation patterns on arterials and major access roads, such as South Airport Boulevard, have been altered. Prior to the current Airport construction, the peak month average daily traffic (ADT) on U.S. 101 ranged from 226,000 to 270,000 vehicles (Caltrans 1997). Major intersections serving SFO currently operate at Level of Service D or better.

3.4 INDUCED SOCIOECONOMIC

Implementation of the Project would not result in induced socioeconomic impacts such as shifts in patterns of population movement and growth, public service demands, or changes in business and economic activity to the extent influenced by the Proposed Action. SFO employment would not change as a result of the Project.

Existing employment at the Airport generates secondary employment, including indirect employment through firms that provide business supplies and services in support of Airport operations and travelers, and induced employment created by the spending of SFO employees. A 1993 Economic Impact Study conducted by Martin Associates for SFO determined that approximately 0.4 induced jobs and 0.1 indirect jobs are created for every direct SFO job. Furthermore, the expenditures of visitors who pass through SFO and on to the Bay Area created approximately 6.1 jobs for each SFO job (Martin Associates, 1993).

3.5 ENVIRONMENTAL JUSTICE

SFO's 65 CNEL noise contour contains nine census tracts. The census tracts containing SFO (6043) and the area southwest of the Airport (6061) do not contain any residents; thus, they would not be included in this analysis. Seven census tracts fall into the SFO neighborhood.

The SFO neighborhood tracts in this study contain 42 percent minorities. This is slightly higher than San Mateo County as a whole, which contains 39 percent minorities, but similar to the average for the State of California (43 percent). On a tract by tract basis, they range from 22 percent to 60 percent minority.

Eight percent of residents in the SFO neighborhood census tracts are at or below the poverty level. This is slightly higher than San Mateo County as a whole, where 6 percent of the residents are at or below the poverty level and lower than the State of California's average of 13 percent. On a tract by tract basis, the residents in the SFO neighborhood that are at or below poverty level range from 4 percent to 12 percent. Five of the seven tracts contain poverty levels at or below the county average.

Median annual household incomes in the area range from $30,409 to $41,361. San Mateo County's median income is $46,437; the SFO neighborhood tracts' median incomes are 65 percent to 89 percent of the County's. The 1990 census data were used for this analysis.

3.6 AIR QUALITY

3.6.1 CLIMATE

The proposed Project is within a region that is characterized by a Mediterranean climate with mild, wet winters and warm, dry summers. In summer, the climate is dominated by the presence of a semi-permanent high pressure cell centered in the northeastern Pacific Ocean, which generally tends to keep storms well north of the San Francisco Bay Area (Bay Area Air Quality Management District [BAAQMD] 1996). In the winter, this high pressure cell moves southward, allowing storms to pass through the area. Regional meteorology is influenced strongly by the Pacific Ocean and local topography. The peninsula region, where SFO is located, includes the Santa Cruz Mountains that block the winds from the west, resulting in variations in summertime maximum temperatures over the peninsula. The maritime influence diminishes with distance from the water. Temperatures measured at the Airport average 57° F annually. The normal maximum temperatures vary between the 70s in summer to the upper 50s in winter. Average annual precipitation is 20 inches per year (Western Regional Climatic Center 2000).

The Bay Area lies within the zone of prevailing westerlies. Winds channel through the Golden Gate and are further split by the East Bay hills toward the south to San Jose and toward the north toward San Pablo Bay and the Carquinez Straits. SFO lies in the northern portion of the peninsula climatic subregion of the Bay Area. The Santa Cruz Mountains extend through the center of the peninsula. Two important gaps occur in these mountains, the San Bruno Gap, extending from Fort Funston on the ocean to SFO and the Crystal Springs Gap, between Half Moon Bay and San Carlos. Because of the orientation and elevation of the San Bruno Gap winds are easily able to flow through the gap toward the Bay. Winds measured at SFO frequently blow from the west and west-northwest. The average wind speed at the Airport is 11 mph. (California Air Resources Board [CARB] 1989).

The height through which pollutants can diffuse is an important factor to air quality. A restriction to the vertical dilution of pollutants occurs when temperatures begin to increase with height, instead of the typical decrease in temperature with height. An increase of temperature with height is known as an inversion. Less vertical mixing and dilution of contaminants would occur if the height of the inversion base is low. The two most common types of inversions in the Bay Area are subsidence inversions (i.e., sinking, warming air in a high pressure system) and radiation inversions (cooling of the ground on clear nights). In general, the potential for air pollution problems in the Project area is greatest during fall and winter, when winds are light and inversion heights are low, such as 1,500 feet (BAAQMD 1991).

3.6.2 AIR QUALITY REGULATIONS AND STANDARDS

The federal government (U.S. EPA) and California state government (CARB) have developed air quality standards for numerous pollutants in order to protect the public health and welfare. National and California Ambient Air Quality Standards (NAAQS and CAAQS respectively) have been established for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), inhalable particulate matter (PM)$_{10}$ and fine particulate matter (PM)$_{2.5}$. Table 3.6-1 lists the state and federal AAQSs for these pollutants.

Table 3.6-1

State and Federal Air Quality Standards[1]

Pollutant	Averaging Time	California Standard[2]		National Standards[3]	
		Concentration	Bay Area Attainment Status[4]	Concentration[5]	Bay Area Attainment Status
Ozone	8-hour			0.08 ppm	U
	1-hour	0.09 ppm (180 ug/m^3)	N	0.12 ppm (235 ug/m^3)	N[6]
Carbon Monoxide	8-hour	9.0 ppm (10 mg/m^3)	A	9 ppm (10 mg/m^3)	A[7]
	1-hour	20 ppm (23 mg/m^3)	A	35 ppm (40 mg/^{3})	A
Nitrogen Dioxide	Annual Average	---	---	0.053 ppm (100 ug/m^3)	A
	1-hour	0.25 ppm (470 ug/m^3)	A	---	---
Sulfur Dioxide	Annual Average	---	---	80 ug/m^3 (0.03 ppm)	A
	24-hour	0.04 ppm (105 ug/m^3)	A	365 ug/m^3 (0.14 ppm)	A
	1-hour	0.25 ppm (655 ug/m^3)	A	---	---
Particulate Matter (PM$_{10}$)	Annual Arithmetic Mean	---	---	50 ug/m^3	A
	Annual Geometric Mean	30 ug/m^3	N	---	---
	24-hour	50 ug/m^3	N	150 ug/m^3	U

Table 3.6-1

State and Federal Air Quality Standards[1]

Pollutant	Averaging Time	California Standard[2]		National Standards[3]	
		Concentration	Bay Area Attainment Status[4]	Concentration[5]	Bay Area Attainment Status
Particulate Matter - Fine ($PM_{2.5}$)	Annual Arithmetic Mean			15 μg/m^3	U
	24-hour			65 μg/m^3	U
Sulfates	24-hour	25 μg/m^3	A		
Lead	Calendar Quarter	---	---	1.5 μg/m^3	A
	30-Day Average	1.5 μg/m^3	A	---	---
Hydrogen Sulfide	1-hour	0.03 ppm (42 μg/m^3)	U		
Vinyl Chloride (chloro-ethene)	24-hour	0.010 ppm (26 μg/m^3)	No information available		
Visibility Reducing particles	8-hour (1000 to 1800 PST)	(See note 8)[8]	U		

Source: BAAQMD, 1999. Internet web page (baaqmd.gov/planning/resmod/baas.htm), updated 6/25/99

Table Notes:

1. Information on designations and standards may be found in "Proposed Amendments to the Designation Criteria and to the Area Designations for State Ambient Air Quality Standards, Proposed Amendments to the San Joaquin Valley and Southeast Desert Air Basin Boundaries, and Maps of Area Designation for the State and National Air Quality Standard." California Air Resources Board Staff Report, November 16, 1995.
2. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour, or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that ARB determines would occur less than once per year on the average. The Lake Tahoe CO standard is 6.0 ppm, a level one-half the national standard and two-thirds the state standard.
3. National standards other than for ozone and particulates, and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. There are some exceptions--the 8-hour national ozone standard is concentration-based rather than exceedance-based. The 8-hour standard is attained when the 3-year average of the 4th highest daily concentrations is 0.08 ppm or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 μg/m^3. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of the 98th percentile is less than 65 μg/m^3.
   Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The natioanl annual particualte standard for PM_{10} is met if the 3-year average falls below the standard at every site

The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially designed cluster of sites falls below the standard.

4. A = Attainment. N = Nonattainment. U = Unclassified.
5. National air quality standards are set at levels determined to be protective of public health with an adequate margin of safety. Each state must attain these standards no later than three years after the state's implementation plan is approved by the Environmental Protection Agency.
6. In August 1998, the Bay Area was redesignated to nonattainment-unclassified for the national 1-hour ozone standard.
7. In April 1998, the Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.
8. Statewide VRP Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

3.6.3 FEDERAL REQUIREMENTS

The Federal Clean Air Act Amendments of 1977 required attainment of Federal AAQS by 1987. At the end of 1987, the San Francisco Bay Area Air Basin was designated as "non-attainment" of the Federal ozone standard, and urbanized portions within the Air Basin were designated as "non-attainment" of the Federal carbon monoxide standard. In November 1990, new Clean Air Act Amendments (CAAA) were passed which require that all non-attainment areas be brought into compliance within 6 to 20 years, based on the severity of the air quality. The Bay Area has since achieved attainment of the Federal carbon monoxide standard and had achieved attainment of the 1-hour ozone standard in 1995. However, later in 1995 and in 1996, the Bay Area exceeded the ozone standard, and therefore in 1998 was redesignated as non-attainment for ozone. Table 3.6-1 above summarizes the attainment status of the Bay Area.

Under the 1990 CAAA, a plan must be developed which shows how each state would achieve the NAAQS. The three co-lead agencies for air quality planning in the Bay Area, BAAQMD, Metropolitan Transportation Commission, and Association of Bay Area Governments revised their plan in light of the recent ozone standard exceedances. The Ozone Attainment Plan was approved by the Air Resources Board in July, 1999. The U.S. EPA is evaluating this submittal.

3.6.4 STATE REQUIREMENTS

Although California AAQSs have been in effect since 1969 with the passage of the Mulford-Carrell Act, there had been no requirements for compliance with these standards. However, with the passage of Assembly Bill 2595, known as the California Clean Air Act (CAA) of 1988, CARB is required to expedite compliance with the state standards. In order to meet this goal, the California CAA requires that air districts which are not in compliance with the California AAQS develop programs for each non-attainment pollutant to come into compliance with the California AAQS.

The San Francisco Bay Area Air Basin is not in compliance with the state standard for ozone. The BAAQMD had developed the Bay Area 1991 Clean Air Plan (CAP) (BAAQMD 1991) in response to the California CAA. The BAAQMD has since prepared the Bay Area 1994 Clean Air Plan and Bay Area 1997 Clean Air Plan as required under the California CAA. Each subsequent CAP contains additional control measures or rescheduling of control measures for stationary and mobile sources. The 1997 CAP also includes transportation control measures.

3.6.5 EXISTING AIR QUALITY

Air quality varies yearly and seasonally due to changes of emissions or meteorology. Meteorological factors can affect the dispersion of pollutants or photochemical reactions. Meteorology is important for short-term variations of pollutant concentrations, but changes in emission amounts are more important to long-term changes in pollutant concentrations.

BAAQMD operates air quality monitoring stations throughout the Bay Area. SFO is located between two monitoring stations, one in the City of San Francisco and one in Redwood City. Measured concentrations are similar at these stations. Table 3.6-2 summarizes the highest ambient air quality concentrations measured at the San Francisco station, which is slightly closer to the Airport than the Redwood City station, for the most recent three years of available data (CARB 1999). These data are expected to be representative of the Project site.

No violations of the O_3, CO, NO_2, or SO_2 National AAQS or California AAQS were measured during 1996 through 1998 at the San Francisco monitoring station. The 24-hour California AAQS for PM_{10} of 50 ug/m^3 was exceeded every year during the last three years. The annual California AAQS and the 24-hour and annual National AAQS for PM_{10} were not exceeded.

Table 3.6-2

Air Pollutant Data Summary - San Francisco, Arkansas Street (1996-1998)

		Concentration (ppm)		
Pollutant	**Averaging Time**	**1996**	**1997**	**1998**
Ozone	8-hour	0.050	0.059	0.046
	1-hour	0.071	0.068	0.53
Carbon Monoxide	8-hour	3.80	3.45	3.96
Nitrogen Dioxide	Annual Average	0.021	0.020	0.020
	1-hour	0.081	0.067	0.081
Sulfur Dioxide	Annual Average	0.001	0.001	0.001
	24-hour	0.008	0.007	0.005
	1-hour	0.03	0.03	0.11
Suspended Particulate Matter (PM_{10})[1]	Annual Arithmetic Mean	24	25	22
	Annual Geometric Mean	21	22	20
	24-hour	71	81	52

Source: CARB (arb.ca.gov, 1999)

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[1] Units of measurement for PM_{10} are ug/m^3 (micrograms per cubic meter).

3.6.6 EMISSIONS

Table 3.6-3 contains an emission inventory for San Mateo County for 1995 and 2000 (BAAQMD 1996). The inventory lists the categories of pollution sources in San Mateo County and the quantity of pollutants associated with each source. The table shows that over 70 percent of carbon monoxide emissions and over 65 percent of PM emissions in San Mateo County may be attributed to transportation sources.

Table 3.6-3

San Mateo County Emission Inventory for 1995 and 2000

Source Category	tons/day				
	CO	ROG	NOx	SO2	PM_{10}
1995					
Residential	22	7	3	0	2
Commercial	11	9	0	0	1
Industrial	5	7	2	0	1
Infrastructure	0	0	1	0	0
Construction	23	1	6	1	8
Transportation	217	33	33	2	35
Agricultural and Natural	1	2	0	0	5
TOTAL	**278**	**59**	**45**	**3**	**52**
2000					
Residential	23	7	3	0	2
Commercial	9	9	0	0	1
Industrial	6	7	2	0	1
Infrastructure	0	0	1	0	0
Construction	24	1	6	1	9
Transportation	160	25	30	2	39
Agricultural and Natural	1	2	0	0	4
TOTAL	**222**	**51**	**42**	**3**	**56**

Source: BAAQMD. 1996.

3.7 WATER QUALITY

Pollutants with the greatest potential to be present in stormwater runoff and groundwater at SFO are oil/greases and petroleum hydrocarbons. Pollutants that may occur to a lesser degree are pesticides, halogenated and non-halogenated solvents, herbicides and alkaline wastes (SFO Master Plan EA 1998). The most common ways for these substances to be transported into stormwater and groundwater systems is through spills or leaks, rainwater flow, and outdoor area wash-downs. Localized soil and groundwater contamination has occurred at SFO as a result of fuel spills or leaks. All of these cases involve fuel spills or leaks and are either cleaned up, under remediation, or being monitored.

SFO is underlain by a shallow groundwater table and a deeper confined water body. Remediation activities at the Airport have focused on soil and shallow groundwater. Deeper groundwater is protected by Bay mud of varying thickness.

The Localizer/DME and glide slope location were investigated in a Geotechnical Investigation prepared by Olivia Chen Consultants/Treadwell & Rollo, Inc. in October 1999. The investigation included two exploratory boring in the vicinity of the Localizer/DME and glide slope sites. The borings were drilled to a depth of 122.5 feet near the glide slope site and 91.5 feet near the Localizer/DME site. Based on the earth materials encountered in the borings, a generalized soil profile may be described as consisting of the following soil types: fill, Bay Mud, and Old Bay Clay. The fill consists of dry to moist, grey-green, very soft to stiff sandy silt. Based on the consultants knowledge of the sites, it is believed that the fill is not engineered, and therefore voids or pockets of loose material may be encountered in the fill. The thickness of the fill at the Localizer/DME site and the glide slope tower site are about 10 to 15 feet, respectively.

Groundwater was encountered in the glide slope boring at about 14 feet below the ground surface (approximate elevation –8.6 feet) and at about 8 feet below the ground surface (approximate elevation –3.8 feet) near the Localizer/DME site. The groundwater levels were measured during drilling and had not stabilized when the measurements were taken. Variations in the groundwater levels are likely to occur due to the close proximity of the site to the Bay. The groundwater elevation at the site is fairly close to sea level and is affected by its fluctuations. The Geotechnical Investigation reports that the anticipated high groundwater level at both sites is near Elevation 0.

Groundwater monitoring was also performed at the PRM site as part of the Geotechnical Investigation prepared by Bay Area Geotechnical Group, 1999. Boring B1 first encountered free water or groundwater at about 5.5 feet below the existing ground surface. In Boring B2, free water was not noted within the hole at a depth of 5 feet, when it was cased and filled with drilling fluid. Both borings were sealed with grout immediately after the drilling and sampling were completed. The 5.5 foot groundwater depth at site B1 is slightly above sea level and representative of the groundwater in the area.

The proposed SOIA procedure and ILS/PRM components are located outside the 100-foot shoreline band subject to the jurisdictional control of the BCDC.

3.8 DEPT. OF TRANSPORTATION ACT, SECTION 4(F)

Section 4(f) of the Department of Transportation Act (40 U. S. Code 303) provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state or local significance, or land from an historic site of national, state or local significance as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land and such program, or the project includes all possible planning to minimize harm resulting from its use.

While the proposed Action would not involve use of park, recreation, wildlife, or historic lands of State of local significance, it would entail new aircraft overflights of such lands. A brief description of the federal and state lands to be overflown that might be affected by the proposed Action are discussed below. A number of county parks (including public open space) and city parks would also be overflown as a result of the proposed Action, but are not discussed in detail. Appendix E provides a detailed list of these county and city facilities.

Don Edwards San Francisco Bay National Wildlife Refuge. This refuge is located in the south bay under the existing flight approach for aircraft landing on SFO runways 28R and 28L. Modifications to the flight tracks and feeder routes serving runways 28R and 28L will result in additional overflights of this refuge, located just south of the Dunbarton Bridge in Alameda County. The Don Edwards San Francisco Bay National Wildlife Refuge consists of sensitive wildlife habitat for birds and mammals, many of which are threatened and/or endangered. The wildlife refuge is largely undeveloped on the east side of the south San Francisco Bay, or has been prone to development in the past, including diking to create salt evaporators; levee construction along Alameda and Coyote creeks, the two largest tributaries of San Francisco Bay to convey floodflow; and the building of concrete support pylons for steel power transmission towers. A network of boardwalks exists to connect the tower pylons with levee access roads in these areas. Public access is limited or even excluded in these areas and there are no improvements for public recreation.

San Francisco State Fish & Game Refuge. On the peninsula in San Mateo County just south and west of SFO, the City of San Francisco Water Department manages a state fish and game refuge. The refuge is closed to public access and contains the potable water storage and conveyance system for the City of San Francisco. Sensitive wildlife species occupy the forested and aquatic habitats of the refuge. State Route 92 bisects the refuge and Interstate Highway 280 parallels it, but public access and facilities are not a factor in the analysis since either access is prohibited or facilities are absent.

3.9 HISTORIC, ARCHITECTURAL, AND ARCHAEOLOGICAL RESOURCES

The proposed PRM, Localizer/DME, and glide slope facility sites would be located within the boundaries of the existing Airport. Existing conditions for historical and cultural resources are described in more detail in the SFO Master Plan EA (1998) and the SFO Runway Reconfiguration Feasibility Study (1999). These two studies indicate that no historical buildings or cultural resource sites occur within the Area of Potential effect for the Proposed Action.

The State Historic Preservation Officer (SHPO) was notified of the Proposed Action by receipt of the scoping memo, "Notice of the Proposed Action and Preparation of Environmental Assessment for Simultaneous Offset Instrument Approach (SOIA)/Precision Runway Monitor (PRM) Project", in December 1999. The SHPO comments to the Scoping Memo are provided in Appendix D. The FAA's determination letter to the SHPO is located in Appendix F.

3.10 BIOTIC COMMUNITIES

The proposed PRM, Localizer/DME, and glide slope facilities would be located within the boundaries of the San Francisco Airport. Photographs of the equipment sites are provided in Figure 1-6. Biological resources on and in the vicinity of the areas where these facilities will be located include a variety of vegetation communities and wildlife habitats.

3.10.1 VEGETATION COMMUNITIES

Vegetation communities occurring on Airport property can be divided into three categories based on habitat sensitivity: Level One, Level Two, and Level Three communities (SFO Master Plan EA 1998). Level One communities are those that are or most closely resemble (in form and function) native habitats. These include seasonal wetlands, salt marsh, mudflats, and open waters of San Francisco Bay. Level Two communities are those that are not native to the area or region or are somewhat disturbed, and provide only limited habitat for plants and wildlife. Level Two communities include California annual grassland or ruderal areas. Level Three communities include areas that have been significantly altered by humans and include development and landscaping. These areas provide minimal habitat for native vegetation and wildlife.

The vegetation communities located within the ground-based equipment construction areas include California grassland/ruderal (Level Two), and developed areas (Level Three). Seasonal wetlands, salt marsh, mudflats and open bay waters (Level One) occur immediately adjacent to the PRM site, but will be avoided and protected during construction activities.

3.10.1.1 Seasonal Wetland

Seasonal wetlands have formed in a variety of isolated depressions on fill soils associated with ruderal areas and grasslands on the airfield. These areas receive and hold water during and after winter and spring rains. They slowly dry out due to runoff and evaporation. Plant species commonly associated with these wetlands include rush (*Juncus* sp.), perennial ryegrass (*Lolium perenne*), wooly heads (*Psilocarphus brivissimus*), brass-buttons (*Cotula coronopifolia*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), alkali heath (*Frankenia salina*), salt grass (*Distichilis spicata*), and fat hen (*Atriplex triangularis*) (SFO Master Plan EA 1998). A wetland delineation of the PRM project site showed jurisdictional wetlands occur immediately north of the project area. Section 3.12, Wetlands provides further detail of the wetland and other waters of the United States environment at SFO.

3.10.1.2 Salt Marsh

Salt marsh communities occur along the shoreline of SFO, primarily southeast of Runway 1R including the shoreline immediately adjacent to the proposed PRM installation site. These marshes consist of highly productive herbaceous, salt-tolerant water-adapted plants. The predominate vegetation in these salt marsh communities includes California cordgrass (*Spartina foliosa*) and common pickleweed (*Salicornia virginica*), intermixed with brass-buttons, Mediterranean barley, alkali heath, gumweed (*Grindelia stricta* var. *angustifolia*), salt grass, California sea-lavender (*Limonium californicum*), Pursh's seablite (*Suaeda depressa*), Douglas baccharis (*Baccharis douglasii*), and fat hen.

3.10.1.3 California annual Grassland/Ruderal

The California grassland/ruderal association occurs primarily in the open, non-paved areas within the airfield area and includes a diversity of native and non-native grassland and ruderal species. The dominant plant species include soft chess (*Bromus mollis*), foxtail brome (*Bromus rubens*), wild oat (*Avena barbata*), foxtail barley (*Hordeum jubatum*), filaree (*Erodium* sp.), Italian thistle (*Carduus pycnocephalus*), wild radish (*Raphanus sativa*), field bindweed (*Convovulus arvensis*), burclover (*Medicago polymorpha*), cut-leaved geranium (*Geranium dissectum*), mustard (*Brassica* sp.), French Broom (*Genista monspessulana*), and yellow star thistle (*Centaurea solstitalis*). The developed sections of the project areas include the airfield runways and associated taxi routes and are generally devoid of vegetation.

3.10.1.4 Mudflats and Open Water

Mudflats occur in the intertidal area along the shoreline of SFO, particularly south and east of runways 28L and 28R. These unvegetated areas are generally exposed at low tide and provide habitat to a variety of invertebrate species. Numerous species of shorebirds and waterfowl also use these areas for foraging and resting.

3.10.2 WILDLIFE HABITATS

The vegetation communities within the project area generally correspond to three broader classifications of wildlife habitat: Annual grassland (California annual grassland, ruderal, developed/landscaped), fresh emergent wetland (seasonal wetland) and saline emergent wetland (salt marsh and mudflat and open waters).

3.10.2.1 Annual Grassland

Large areas of grassland that occur within the airfield provide limited habitat for a variety of small birds, mammals, and reptiles. Birds species that periodically use these area include mourning dove (*Zenaida macroura*), European starling (*Sturnus vulgaris*), red-winged blackbird (*Agelaius phoeniceus*), northern mockingbird (*Mimulus polyglottos*), house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), and western meadowlark (*Sturnella neglecta*) (SFO Master Plan EA 1998). Mammals occasionally found there include black-tailed jackrabbit (*Lepus californicus*), deer mouse (*Peromyscus maniculatus*), and California meadow vole (*Microtus californicus*). Reptiles such as western fence lizard (*Sceloporus occidentalis*) and gopher snake (*Pituophis melanoleucus*) also use these habitats.

3.10.2.2 Fresh Emergent Wetland

Seasonal wetlands occur in a number of isolated depressions within portions of the airfield that are generally associated with grassland or ruderal habitats. These areas provide ephemeral habitat for a variety of wildlife species including western aquatic garter snake (*Thamnophis couchi*) and Pacific treefrog (*Hyla regilla*). Black-necked stilts (*Himantopus mexicanus*), American avocet (*Recurvirostra americana*), red-winged blackbirds, and killdeer (*Charadrius vociferus*), may also frequent these areas during the wetter periods of the year.

3.10.2.3 Saline Emergent Wetland

Saline emergent wetland within the project area includes the salt marsh bordering the southeast shore of SFO and the associated tidal mudflats. These areas support a diversity of estuarine invertebrate species that provide food for numerous shorebirds including western sandpipers (*Calidris mauri*), least sandpiper (*Calidris minutilla*), whimbrel (*Numenius phaeopus*), long-billed dowitcher (*Limnodromus scolopaceus*), and marbled godwit (*Limosa fedoa*). The mudflats and open water also provide habitat for a variety of waterfowl.

3.11 ENDANGERED AND THREATENED SPECIES OF FLORA AND FAUNA

Several species known to occur within the SFO area are accorded special status because of their rarity or vulnerability to habitat loss or population decline. These species are protected under the Federal Endangered Species Act. Table 3.11-1 presents a list of species for which potential habitat occurs at SFO. Of these species, there is potential habitat near the project site for only the salt marsh harvest mouse (*Reithrodontomys raviventris raviventris*) However, this species in not known to occur at SFO.

Table 3.11-1

Special-Status Species with Habitat at SFO that Could Potentially Occur at or in the Vicinity of the Project Site

Species	Federal Status	Occurrence in Project Area
California red-legged frog *Rana aurora draytoni*	FT	California red-legged habitat is located west of U.S. 101, but none exists at the project site
San Francisco garter snake *Thamnophis sirtalis terataenia*	FE	Occurs west of U.S. 101, but no suitable habitat exists at the project site.
California Clapper rail *Rallus longirostris*	FE	No rails have been reported at SFO.
California brown pelican *Pelecanus occidentalis californicus*	FE	California brown pelican is a seasonal visitor to the region but would use the open waters offshore from the project site.
Alameda song sparrow *Melospiza melodia pusillula*	FSC	No Alameda song sparrows have been reported at SFO.
Salt marsh common yellowthroat *Geothlypis trichas sinuosa*	FSC	Local marshes provide suitable foraging habitat for this species, but no suitable habitat exists on the project site.
Salt marsh harvest mouse *Reithrodontomys raviventris raviventris*	FE	Potentially suitable habitat occurs in the salt marsh habitat along the shore, but no populations of this species are known to occur at SFO.

Source: Parsons Harland Bartholomew and Associates, Inc., 2000

Notes:
[1] Federal status

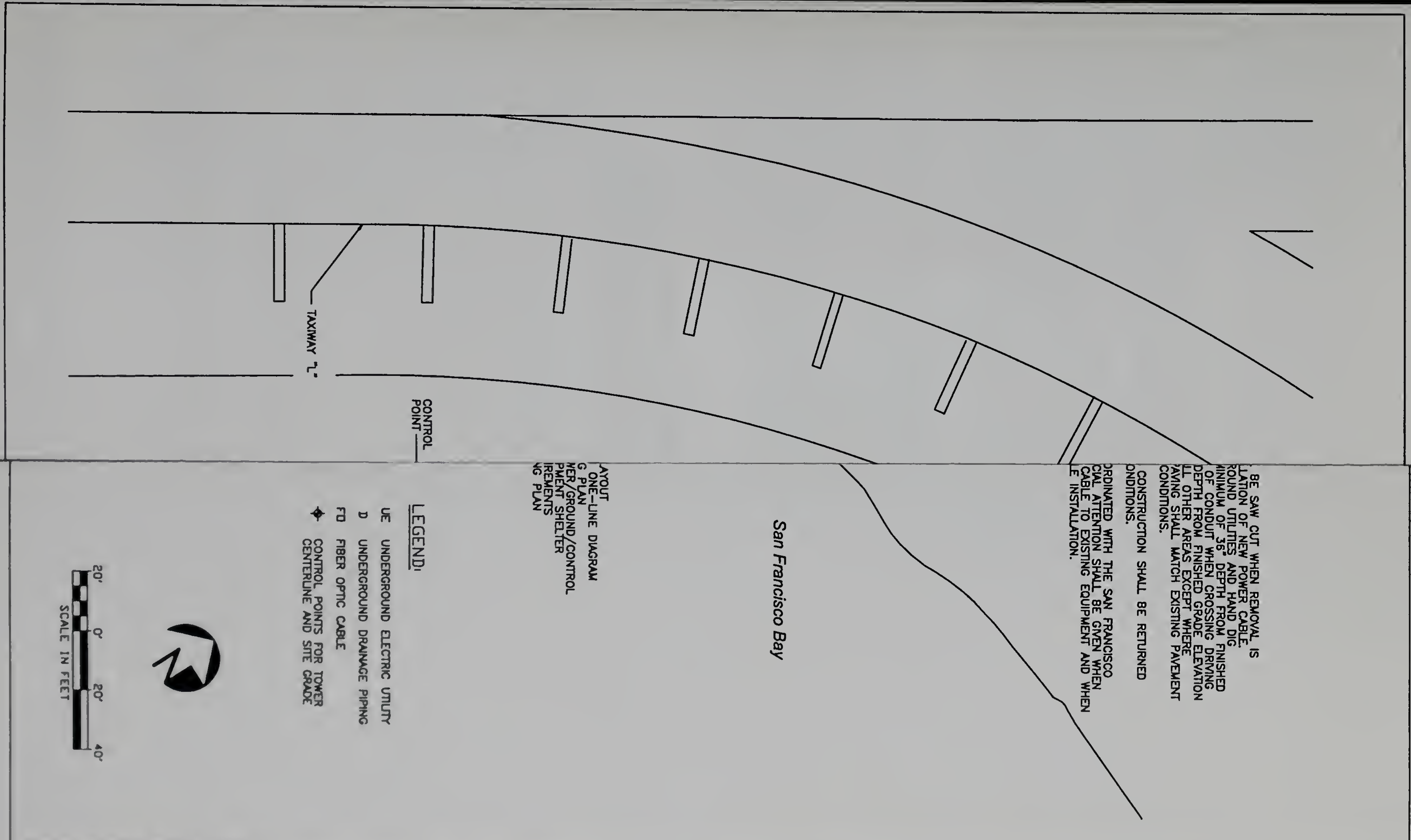
FE =	Federally listed Endangered
FT =	Federally listed Threatened

3.12 WETLANDS

SFO has received previous approvals for wetland fill projects from the U.S. Army Corps of Engineers (Corps) pursuant to Section 404 of the federal Clean Water Act (CWA). Also, the California State Water Resources Control Board (SWRCB) has certified that water quality at SFO would be protected to Section 401 of the CWA. The proposed location of the PRM installation borders on, but lies outside of mapped jurisdictional wetlands (Figure 3.12-1). These wetlands include an area of seasonal wetland approximately 0.05 acre immediately north of the proposed PRM facility location.

As indicated in Section 3.10.2.2 above, seasonal wetlands occur in a number of isolated depressions within portions of the airfield that are generally associated with grassland or ruderal habitats. These areas provide ephemeral habitat for a variety of wildlife species.

File: 736312\Graphics\PRM-Site Date: 3/16/2000



TAXIWAY "L"
CONTROL POINT
San Francisco Bay
BE SAW CUT WHEN REMOVAL IS
LLATION OF NEW POWER CABLE.
ROUND UTILITIES AND HAND DIG
MINIMUM OF 36" DEPTH FROM FINISHED
OF CONDUIT WHEN CROSSING DRIVING
DEPTH FROM FINISHED GRADE ELEVATION
LL OTHER AREAS EXCEPT WHERE
PAVING SHALL MATCH EXISTING PAVEMENT
CONDITIONS.
CONSTRUCTION SHALL BE RETURNED
ONDITIONS.
ORDINATED WITH THE SAN FRANCISCO
CIAL ATTENTION SHALL BE GIVEN WHEN
CABLE TO EXISTING EQUIPMENT AND WHEN
LE INSTALLATION.
LAYOUT
ONE-LINE DIAGRAM
G PLAN
WER/GROUND/CONTROL
PMENT SHELTER
IREMENTS
NG PLAN
LEGEND:
UE UNDERGROUND ELECTRIC UTILITY
D UNDERGROUND DRAINAGE PIPING
FO FIBER OPTIC CABLE
◆ CONTROL POINTS FOR TOWER CENTERLINE AND SITE GRADE
20' 0' 20' 40'
SCALE IN FEET

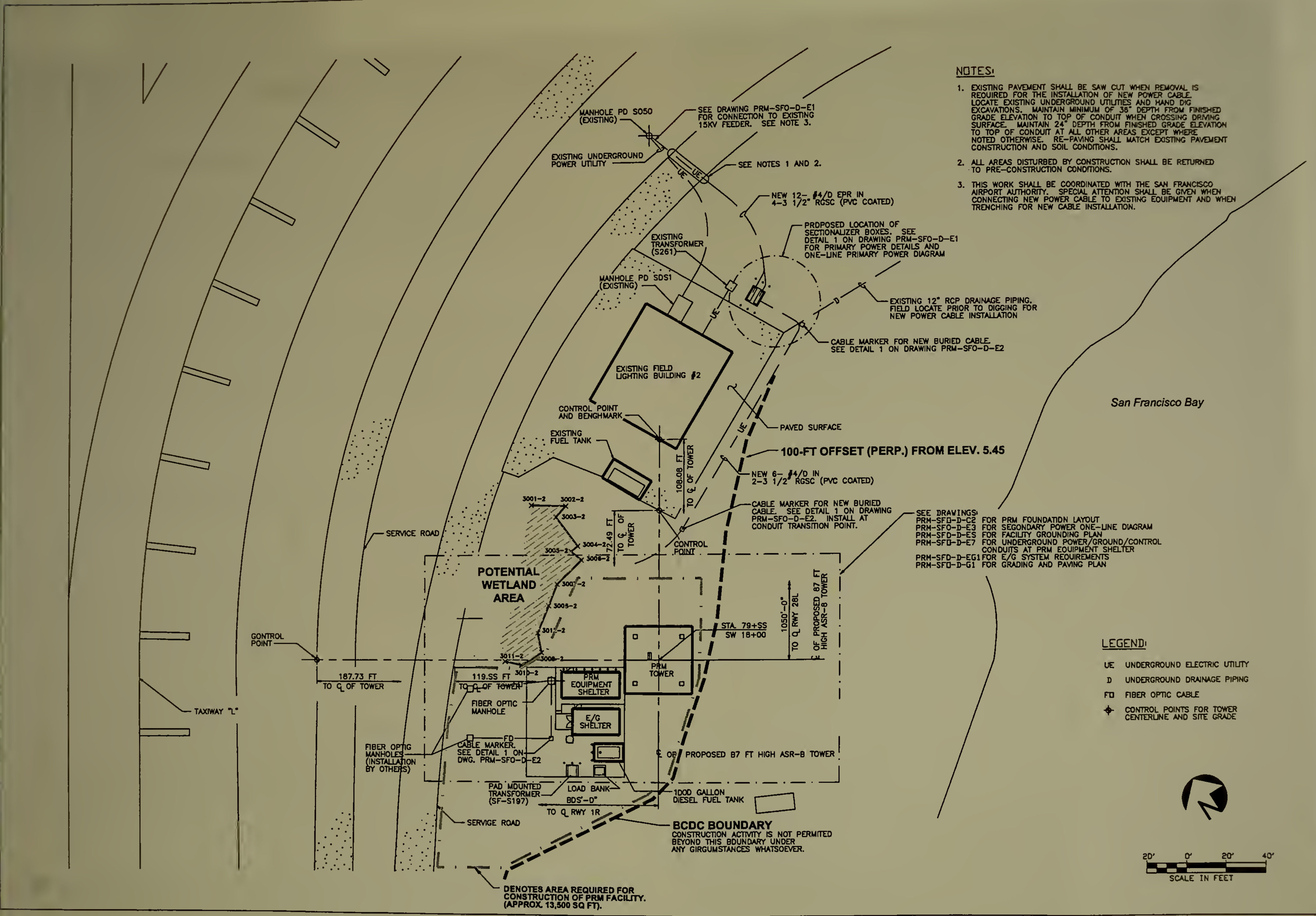
Source: Raytheon Systems Company

SFO
SOIA/PRM EA

Area of Potential Jurisdictional Wetland

PARSONS
HARLAND BARTHOLOMEW
& ASSOCIATES, INC.

Figure 3.12-1


MANHOLE PD S050 (EXISTING)
SEE DRAWING PRM-SFO-D-E1 FOR CONNECTION TO EXISTING 15KV FEEDER. SEE NOTE 3.
EXISTING UNDERGROUND POWER UTILITY
SEE NOTES 1 AND 2.
UE
NEW 12- #4/D EPR IN 4-3 1/2" RGSC (PVC COATED)
PROPOSED LOCATION OF SECTIONALIZER BOXES. SEE DETAIL 1 ON DRAWING PRM-SFO-D-E1 FOR PRIMARY POWER DETAILS AND ONE-LINE PRIMARY POWER DIAGRAM
EXISTING TRANSFORMER (S261)
MANHOLE PD SDS1 (EXISTING)
EXISTING 12" RCP DRAINAGE PIPING. FIELD LOCATE PRIOR TO DIGGING FOR NEW POWER CABLE INSTALLATION
D
CABLE MARKER FOR NEW BURIED CABLE. SEE DETAIL 1 ON DRAWING PRM-SFO-D-E2
EXISTING FIELD LIGHTING BUILDING #2
CONTROL POINT AND BENCHMARK
PAVED SURFACE
EXISTING FUEL TANK
100-FT OFFSET (PERP.) FROM ELEV. 5.45
108.08 FT TO ℄ OF TOWER
NEW 6- #4/D IN 2-3 1/2" RGSC (PVC COATED)
CABLE MARKER FOR NEW BURIED CABLE. SEE DETAIL 1 ON DRAWING PRM-SFO-D-E2. INSTALL AT CONDUIT TRANSITION POINT.
San Francisco Bay
3001-2
3002-2
3003-2
3004-2
3005-2
3006-2
3007-2
3008-2
3009-2
3010-2
3011-2
3012-2
72.49 FT TO ℄ OF TOWER
CONTROL POINT
SERVICE ROAD
POTENTIAL WETLAND AREA
1050'-0" TO ℄ RWY 28L
℄ OF PROPOSED 87 FT HIGH ASR-8 TOWER
STA. 79+SS SW 18+00
CONTROL POINT
187.73 FT TO ℄ OF TOWER
119.SS FT TO ℄ OF TOWER
PRM TOWER
PRM EQUIPMENT SHELTER
FIBER OPTIC MANHOLE
E/G SHELTER
TAXIWAY "L"
FIBER OPTIC MANHOLES (INSTALLATION BY OTHERS)
FD
CABLE MARKER. SEE DETAIL 1 ON DWG. PRM-SFO-D-E2
℄ OF PROPOSED 87 FT HIGH ASR-8 TOWER
PAD MOUNTED TRANSFORMER (SF-S197)
LOAD BANK
8DS'-0" TO ℄ RWY 1R
1000 GALLON DIESEL FUEL TANK
SERVICE ROAD
BCDC BOUNDARY
CONSTRUCTION ACTIVITY IS NOT PERMITED BEYOND THIS BOUNDARY UNDER ANY CIRCUMSTANCES WHATSOEVER.
DENOTES AREA REQUIRED FOR CONSTRUCTION OF PRM FACILITY. (APPROX. 13,500 SQ FT).
20' 0' 20' 40'
SCALE IN FEET

NOTES:

1. EXISTING PAVEMENT SHALL BE SAW CUT WHEN REMOVAL IS REQUIRED FOR THE INSTALLATION OF NEW POWER CABLE. LOCATE EXISTING UNDERGROUND UTILITIES AND HAND DIG EXCAVATIONS. MAINTAIN MINIMUM OF 36" DEPTH FROM FINISHED GRADE ELEVATION TO TOP OF CONDUIT WHEN CROSSING DRIVING SURFACE. MAINTAIN 24" DEPTH FROM FINISHED GRADE ELEVATION TO TOP OF CONDUIT AT ALL OTHER AREAS EXCEPT WHERE NOTED OTHERWISE. RE-PAVING SHALL MATCH EXISTING PAVEMENT CONSTRUCTION AND SOIL CONDITIONS.
2. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE RETURNED TO PRE-CONSTRUCTION CONDITIONS.
3. THIS WORK SHALL BE COORDINATED WITH THE SAN FRANCISCO AIRPORT AUTHORITY. SPECIAL ATTENTION SHALL BE GIVEN WHEN CONNECTING NEW POWER CABLE TO EXISTING EQUIPMENT AND WHEN TRENCHING FOR NEW CABLE INSTALLATION.

SEE DRAWINGS:

PRM-SFO-D-C2	FOR PRM FOUNDATION LAYOUT
PRM-SFO-D-E3	FOR SECONDARY POWER ONE-LINE DIAGRAM
PRM-SFO-D-E5	FOR FACILITY GROUNDING PLAN
PRM-SFO-D-E7	FOR UNDERGROUND POWER/GROUND/CONTROL CONDUITS AT PRM EQUIPMENT SHELTER
PRM-SFO-D-EG1	FOR E/G SYSTEM REQUIREMENTS
PRM-SFO-D-G1	FOR GRADING AND PAVING PLAN

LEGEND:

UE	UNDERGROUND ELECTRIC UTILITY
D	UNDERGROUND DRAINAGE PIPING
FO	FIBER OPTIC CABLE
⌖	CONTROL POINTS FOR TOWER CENTERLINE AND SITE GRADE

Source: Raytheon Systems Company

SFO
SOIA/PRM EA

Area of Potential Jurisdictional Wetland

PARSONS
HARLAND BARTHOLOMEW & ASSOCIATES, INC.

Figure 3.12-1

The San Francisco Bay Conservation and Development Commission (BCDC) has jurisdiction over all tidal areas of San Francisco bay and a shoreline band extending 100 feet inland from the mean high-tide line. The proposed construction area for the PRM facility is immediately adjacent to, but inland from this boundary (Figure 3.12-1). The exact boundary will be marked prior to construction.

3.13 FLOODPLAINS

The Project site is located on landfill that was placed in San Francisco Bay in the 1940's (LEE/BC). The preexisting landform (San Francisco Bay) and the present modification of it (man-made fill) do not meet the geological definition of floodplain. The proposed PRM, Localizer/DME and glide slope facilities would be located within an area of SFO that is drained via drainage pumps to the San Francisco Bay.

The proposed ILS/PRM construction areas would be located within the boundaries of the existing Airport and adjacent to the Zone C areas of the 100-year floodplain as mapped by FEMA in 1984 (SFO Master Plan EA 1998). Zone C designated areas, areas of minimal flooding, include the main Airport terminal complex, and areas south and east of the main complex. However, as noted in the Master Plan EA, the FEMA mapping has not been updated since 1984, and it is likely that a number of drainage improvements already completed and/or are in progress have effectively eliminated flooding hazards in the vicinity of the ILS/PRM facilities. In addition, the Master Plan EA states that no coastal flooding zones are identified by FEMA within the Airport boundary.

3.14 COASTAL ZONE MANAGEMENT PROGRAM AND COASTAL BARRIERS

The proposed ILS/PRM construction areas would be located within the boundaries of the existing Airport. The Bay Conservation and Development Commission (BCDC) is the agency responsible for implementing the provisions of the Coastal Zone Management Act under the State of California's coastal zone management program. BCDC jurisdiction in the project area extends along San Francisco Bay to a line of 5.0 mean sea level (5.45 NGVD) and over a 100-foot shoreline band inland from the line of mean sea level.

As discussed in Section 3.12, the PRM site is located immediately adjacent to, but not within, the BCDC jurisdictional boundary.

3.15 WILD AND SCENIC RIVERS

The Project would not affect any rivers designated as "wild and scenic" pursuant to the federal Wild and Scenic Rivers Act. The nearest river to the Project site designated as "wild and scenic" is the American River, which is located approximately 80 miles northeast of SFO (SFO Master Plan EA 1998).

3.16 FARMLAND

There are no existing agricultural operations on the SFO property or in the vicinity. There would be no impacts to farmlands because no farmland of any type would be converted at SFO as a result of the Project.

3.17 ENERGY SUPPLY AND NATURAL RESOURCES

SFO related activities consume substantial amounts of energy for transportation purposes (aircraft, ground support equipment, and motor vehicle traffic); for building space and water heating, ventilation, and lighting; and for industrial processes such as aircraft maintenance. Most of this energy is derived from non-renewable energy resources (SFO Master Plan EA 1998).Ground-based facilities within the SFO airfield, such as the PRM, Localizer/DME and glide slope, are powered by electricity provided by Hetch Hetchy Water and Power, a department of the City and County of San Francisco. Hetch Hetchy pays a fee to PG&E to transmit power from its hydroelectric generation facilities over PG&E lines. Existing annual electricity consumption is approximately 280 million kilowatt-hours (Lam, 1997), which is equivalent to approximately 2,800 billion Btu. The existing peak demand (over a 15-minute period) at SFO is approximately 38 MW, while the capacity of the electrical distribution system for SFO is approximately 46 MW.

Back-up power supply consists of emergency generators and the United Airlines generation plant, which can be used by SFO in the event of a PG&E power failure.

3.18 LIGHT EMISSIONS

The affected visual environment at SFO includes all those areas of the Airport or in the vicinity of the Airport that could have a direct line of sight to the Project. This viewshed, or area of visual exposure, generally includes the areas south and east of the SFO passenger terminals for distances up to roughly one mile, beyond which the proposed facilities would not be evident on the landscape due to distance. Visual impacts could occur within this area if the Project-related night lighting were obtrusive to sensitive receptors, or caused hazardous or annoying glare.

Potentially sensitive viewpoints from which the Project lighting would be visible include portions of the adjacent Airport frontage road, Millbrae Park, and nearby hotels and other businesses. Within the Airport, passengers in the waiting areas of Gates 21, 27, and 28 would have unobstructed views of the PRM through east- and south-facing windows.

Within this viewshed existing Airport night lighting is highly prominent. In this context, the lighting of the main terminals and aircraft aprons is by far the most visible source of night lighting in the area, overwhelming the light from all other Airport sources, including beacons on individual structures and appurtenances such as those under the proposed action. The prominent terminal and apron lighting attracts the attention of viewers, and tends to divert attention and awareness from other light sources, including runway lighting and beacons associated with towers and appurtenances. Other existing night lighting in the vicinity of sensitive receptors in off-site locations, such as street, parking lot, and building lighting, have the effect of reducing awareness of distant lights such as those under the proposed action, due to the eye's tendency to adjust to the much brighter ambient light levels of adjacent outdoor lighting.

3.19 ELECTRONIC EMISSIONS

Radio Frequency (RF) radiation sources exist throughout most airports. These are typically in the form of transmitting antennas and radar facilities. RF radiation hazards can exist when there is sufficient power contained in the incident radiation from these sources to cause damage to humans. Additionally, RF radiation is hazardous with regard to fuel handling operations and electroexplosive devices (EED).

Nonionizing radiation is electromagnetic radiation emitted at wavelengths whose photon energy is not high enough to ionize or "charge" an absorbing molecule (i.e., human tissue). Nonionizing radiation is considered to be that part of the electromagnetic radiation spectrum with wavelengths greater than 10^{-7} meters and consists primarily of near ultraviolet radiation, visible radiation or light, infrared radiation, and radio frequency (RF) radiation. RF radiation accounts for the largest range of frequencies among the various types of nonionizing radiation and is used extensively to transmit radio, television, and radar signals. RF radiation has a frequency range of 10 kilohertz to 300 gigahertz.

Humans are affected when RF radiation agitates the molecules of the body, causing them to vibrate and rotate faster than normal. This accelerated motion produces heat. When exposure to RF radiation ends, the additional molecular agitation stops. Nonionizing radiation has intrinsic energies far too small to ionize molecules within a living organism. Rather than evoking changes in molecules (as in ionizing radiation), nonionizing radiation simply agitates molecules, making them vibrate and rotate faster than normal, the equivalent of adding heat to the body. When exposure to nonionizing radiation ends, molecular agitation produced by the nonionizing radiation ceases. Heat induced in a warm-blooded animal by exposure to RF radiation at relatively low incident power densities is normally accommodated within the thermoregulatory capabilities of the animal. However, depending on the species, heat produced at relatively high intensities may exceed the thermoregulatory capabilities of the animal, and compensation for such effects may be inadequate. Exposure at high intensities, therefore, could cause gross heating and subsequent thermal distress or irreversible thermal damage.

RF radiation can also produce sufficient energy to ignite fuel vapor or EEDs. The most current standards for nonionizing radiation exposure are based on maximum permissible exposure (MPE) levels recommended by the Institute of Electrical and Electronics Engineers (IEEE, 1992). The MPE level varies depending on the frequency of the RF source and whether or not emissions occur in controlled or uncontrolled environments. MPEs are expressed in milliwatts per square centimeter ($\mathrm{Mw/cm^2}$). The IEEE standard is recognized as an American National Standard by the American National Standards Institute (ANSI). Standards for fuel handling and EED hazards are taken from Air Force Technical Manual TO 31Z-10-4, *Electromagnetic*

Radiation Hazards (USAF 1989). Since EEDs are not used on civilian aircraft or at civil airfields, EED hazards would not be further addressed in this assessment.

3.20 SOLID WASTE

The proposed PRM, Localizer/DME, and glide slope facilities would be unmanned during normal operation. Therefore, the Proposed Action would not result in the generation of solid waste. Construction related waste would be disposed of using standard disposal practices. Excess spoils from excavation will temporarily be stored on airport property until a permanent disposal location can be found either on- or off-site.

South San Francisco Scavenger Company collects a significant amount of the construction and demolition materials generated at SFO. These materials are collected in debris boxes left at each construction site. When full, the debris boxes are transported to the Blue Line Transfer Station where recoverable materials are sorted from waste materials(SFO Master Plan EA 1998).

3.21 CONSTRUCTION

Construction impacts would include temporary (short-term) effects such as increased air pollutant emissions, noise disturbance, traffic congestion, soil erosion, water quality degradation, and exposure of workers to hazardous materials (SFO Master Plan EA 1998). These temporary impacts are intermittent in nature and can be minimized with existing environmental controls.

As part of the SFO Master Plan Final Environmental Impact Report (FEIR) (City and County of San Francisco, 1998), SFO has committed to a set of construction-related measures to mitigate potentially significant Project impacts. These measures are described in detail in Section 4.20 Construction, of the SFO Master Plan EA (1998) and are further discussed in the Noise, Transportation, Air Quality, Water Quality, and Hazardous Materials sections of this report. For example, any construction debris generated would be disposed of at an appropriate off-site facility in accordance with applicable federal, state, and local regulations.

3.22 VISUAL

The proposed PRM, Localizer/DME, and glide slope facilities would be located within the boundaries of the existing Airport. The affected visual environment at SFO includes all those areas of the Airport or in the vicinity of the Airport that could have a direct line of sight to the Project. This viewshed, or area of visual exposure, generally includes the areas south and east of the SFO passenger terminals for distances up to roughly one mile, beyond which the proposed facilities would not be visually obvious due to distance. Visual impacts could occur within this area if the proposed facilities intruded prominently into scenic views or view corridors as seen from sensitive public viewpoints. However, the structural components of the Project would not be visually different in character, design, or massing than other existing elements of the Airport.

The visual resource setting of the Airport property and the vicinity falls into six general categories: 1) the airfields, an open landscape in which site improvements are limited to various isolated utilitarian structures within an expanse of paved runway and open grassland that offers long, unimpeded views to the San Francisco Bay to the east. The vast scale and open character of this landscape, the continuous landing and departing of aircraft, and the scenic Bay backdrop, are a tremendous visual attraction, of high visual interest; 2) an intensely urban/architectural transportation facility of enormous scale, made up of surface and elevated roadways, parking structures and the passenger terminal, comprising a vivid, distinctive image of high visual interest; 3) the Bayshore Transportation Corridor, including structures of Highway 101, CalTrain and, soon, Bay Area Rapid Transit (BART), of low visual interest and quality; 4) low- to mid-rise hotel and Airport-related commercial development to the south of SFO, of low visual interest and quality; 5) landscaped urban lands on and adjacent to Airport property, as well as Bayside park facilities and trails, of moderate to high visual quality; and 6) the San Francisco Bay and East Bay Foothills beyond, of very high visual quality.

Thus, despite the intensely developed and utilitarian character of SFO, much of the Project viewshed can be considered to be a scenic attraction of high visual interest and scenic quality for reasons enumerated above – i.e., the vast, open landscape; the airport and its activities, which to many viewers are a valued and fascinating visual attraction in themselves; and the panoramic views of San Francisco Bay and the East Bay hills.

3.23 HAZARDOUS MATERIALS

The proposed PRM, Localizer/DME, and glide slope facilities would be located within the boundaries of the existing Airport. The Localizer/DME and glide slopes would be located adjacent to existing access roadways. The glide slope would be located next to an existing glide slope tower/support building and associated pavement. A geotechnical Investigation prepared by Olivia Chen Consultants, Inc./Treadwell & Rollo, Inc., October 1999, provides information about the Localizer/DME and glide slope sites. Both sites are reported to be located on fill material of approximately 10 to 15 feet in depth.

Information about the PRM site is provided in the Site Assessment Report of Precision Runway Monitor Site, prepared by LEE Incorporated/Brown & Caldwell (LEE/BC), September 1999.

The only SFO structure that is located near the proposed ground based equipment sites is the Field Lighting Building number 2. This building is located 180 feet north of the proposed PRM site. Completed by the Airport in 1987 under Airport Contract Number 823, the facility consists of a reinforced concrete block building with surrounding pavement. An outdoor, above-ground diesel storage tank within a secondary concrete containment is located near the south side of the building. This 4,000 gallon capacity tank is used to supply diesel fuel to an emergency generator at the facility. A plastic drain pipe from the tank's secondary containment discharges into open ground, approximately 100 feet north of the proposed PRM facilities. The drain pipe facilitates the drainage of rainwater that accumulates in the tank's secondary containment.

Significant site features include the following:

- A stockpile of boulder-sized angular rocks exists along the east perimeter of the PRM site. Rock constituents identified include greenstone, graywacke, and serpentinite/

ultramafic rock. According to Airport staff, these rocks were stockpiled by the Airport in the 1990's for construction of a breaker along the Airport perimeter.

- A stockpile of concrete manholes is located alongside the perimeter road west of the proposed footprint of the PRM facilities. A smaller stockpile of concrete manholes is located 80 feet south of the subject site.

A limited review of historical aerial photographs, maps, and other documents available at the Airport's Facilities, Operations, and Maintenance Division library was completed to evaluate site usage history. The document review indicated that the area encompassing the PRM site was, prior to the 1940's, part of the San Francisco Bay. In the late 1940's, during the Airport expansion and runways construction, the area currently encompassing the PRM site and nearby runways was filled. Since the original filling, the subject site has remained an open area covered by grasses and low bushes between active runways and taxiways to the west and the San Francisco Bay to the east.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

Pursuant to FAA Order 1050.1D, Chapter 6, Paragraph 66, *Environmental Consequences*, this Chapter describes the environmental impacts of the No Action and Proposed Action, any adverse environmental effects which cannot be avoided should the proposal be implemented, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented. This Chapter also describes the mitigation measures designed to mitigate adverse environmental impacts to a less-than-significant level.

4.1 NOISE

4.1.1 METHODS FOR ANALYZING IMPACTS

The noise analyses for this study were prepared using the FAA's Integrated Noise Model (INM) Version 6.0. This model was used to calculate noise contours around SFO and to determine Community Noise Equivalent Levels (CNEL) at various location points around the Airport. The FAA's standard methodology for computing noise contours calls for use of the Day-Night Level (DNL), however, CNEL is required to meet standards in the state of California and is an acceptable substitute. The CNEL methodology was originally developed to describe the cumulative impact of noise exposure on residential areas. It combines the loudness and length of time each aircraft noise event is heard with the number of events and time of day that the operations occur.

The INM model was used to identify the number of people and amount of property significantly affected by aircraft noise inside the 65-decibel (dB) noise contour. Models of the Proposed Action and No Action alternatives were prepared to determine the effect of the procedure on the communities surrounding the Airport, particularly Foster City and other communities located near the proposed SOIA. A future-year (2007) projection of each case was also run to determine the combined effect on noise of the proposed SOIA as the fleet mix changes and expands.

To develop noise contours, the INM requires a number of inputs. Many are generic and can be applied at any airport (e.g., engine noise at thrust settings, aircraft speeds, standard glide slopes), and others are specific to SFO (e.g., runway orientation and use, number of operations and fleet mix, flight tracks). Airport-specific inputs for this analysis were based on noise analyses prepared by Transportation Solutions, Inc.

4.1.1.1 Time of Day of Operations

The CNEL methodology used in this study was developed to provide a way to describe the cumulative effect of aircraft noise exposure. It mathematically combines three factors that influence perception of aircraft noise:

- Loudness and length of time an individual aircraft is heard. The louder an aircraft is and the longer it is heard, the more objectionable it becomes.

- The number of aircraft heard in a day. The more operations heard, the more objectionable each operation becomes.
- The time of day in which aircraft are heard. Aircraft are perceived to be noisier in the evening (i.e., 7:00 p.m. to 10:00 p.m.), and even more objectionable at night (i.e., 10:00 p.m. to 7:00 a.m.). In calculating CNEL, the number of evening operations is multiplied by three, and the number of night operations is multiplied by ten in recognition of the increased annoyance generally associated with aircraft noise during these time frames. In modeling arrivals to runways 28L or 28R at 1997 operation levels, 72.7 percent were assumed to occur during day hours, 16.1 percent during evening hours, and 11.2 percent during night hours.

4.1.1.2 Aircraft Operations and Fleet Mix

Annual aircraft operations and fleet mix from 1997, prepared for the SFO Runway Reconfiguration Feasibility Study (1999), were used to model existing conditions. The 1997 numbers were used because they provided the most complete data available, are more conservative (included more operations) than 1998 data, and are consistent with the numbers used in the 1999 Feasibility Study. The fleet mix and total number of aircraft used to model the annual average day is shown in Table 4.1-1. The 1997 fleet mix includes Stage 2 aircraft, which are not allowed to operate in commercial air carrier fleets after December 31, 1999, according to FAR Part 91 General Operating and Flight Rules.

The number of operations and fleet mix used for the analysis of 2007 conditions are also shown in Table 4.1-1. The fleet mix used was taken from the SFO Runway Reconfiguration Feasibility Study (1999); total numbers of operations were computed assuming a 1 percent annual growth in total operations from 1997 (i.e., the same rate of growth assumed in the 1999 Feasibility Study). As shown, the fleet mix includes only Stage 3 aircraft, some of which are significantly quieter than some of the Stage 2 aircraft they replace. Future fleet mix for SFO was estimated using the existing fleet mix as a base and considering trends in aircraft retirements and aircraft orders of the major airlines operating at SFO. The resulting fleet mix considers increase in average seats per operation and includes the weekly operations of new larger aircraft (NLA).

4.1.1.3 Flight Track Geometry and Use

This study primarily utilized existing flight tracks prepared for the SFO Runway Reconfiguration Feasibility Study (1999); however, some modifications were required. The 1999 Feasibility Study noise analysis, while done at an appropriate level of detail to evaluate differences between runway plans, did not provide detailed modeling of dual arrival streams to runways 28L and 28R (i.e., only one arrival stream to each runway was modeled). To more precisely model existing conditions, additional tracks were added to the model: (1) ILS approaches to both runways 28L and 28R; and (2) the SOIA on Runway 28R. A close-up of the difference between the approach tracks adjacent to Foster City is shown in Figure 4.1-1. The centerlines of the existing tracks used for modeling existing conditions are shown in Figure 4.1-2. Since aircraft do not follow a single path in the sky, these tracks were dispersed using standard INM protocols and statistical distributions.

Table 4.1-1

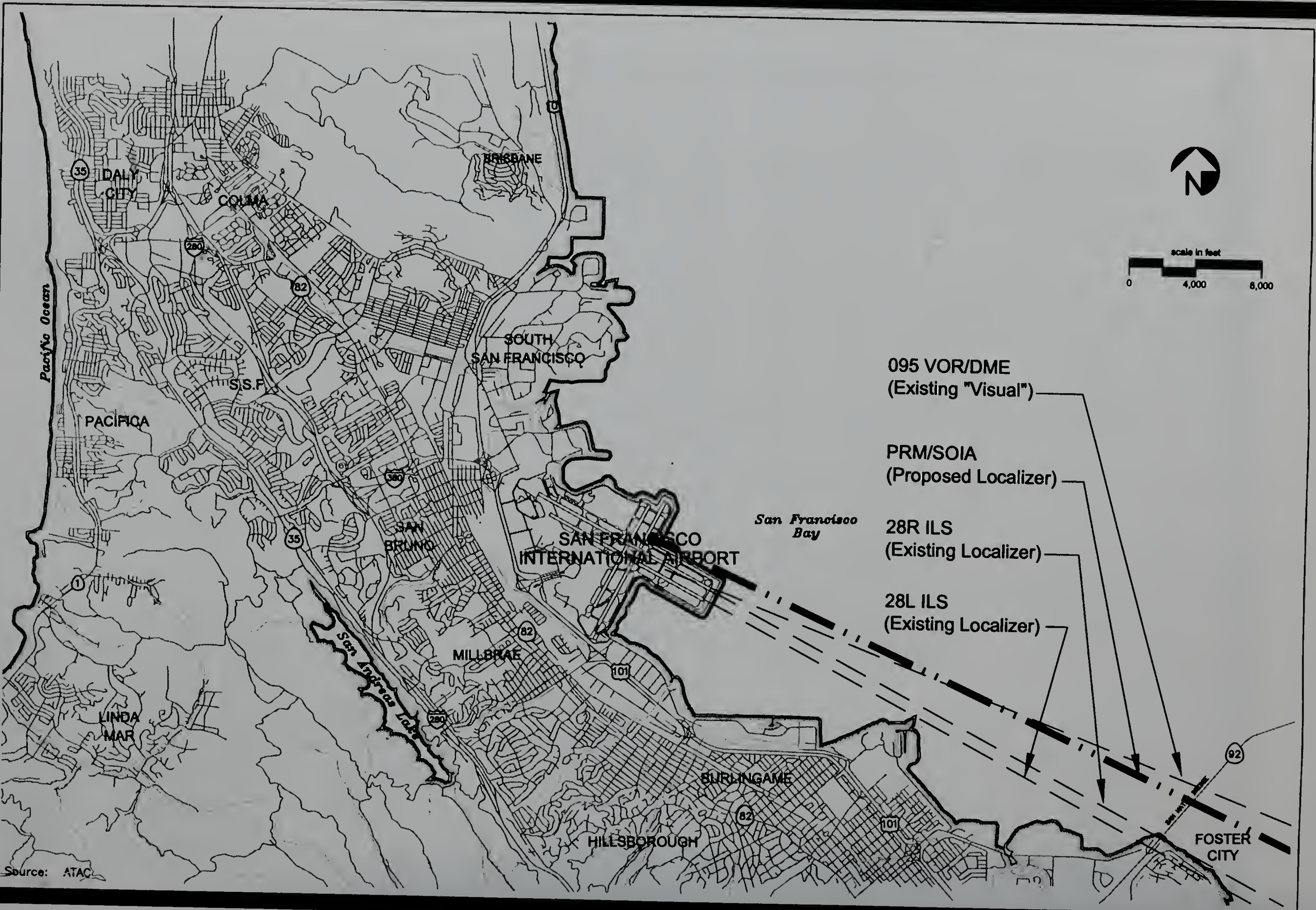
Fleet Mix Used for Noise Calculations

Aircraft Type	1997	2007
AIR CARRIER/CARGO		
B737-200	14.5	0.0
B737-500	152.2	173.8
B737-300	240.1	254.9
MD82	79.6	61.2
A320	59.5	102.8
B727	33.6	0.0
B757	155.9	182.0
B767	46.6	61.5
DC8	6.5	7.1
DC10	46.9	25.9
MD11	1.8	6.9
B777	9.7	30.5
A330/340	0.0	25.9
B747-200	17.9	0.0
B747-400	47.7	67.7
NLA	0.0	6.5
COMMUTER		
J31	79.4	22.5
CRJ	4.0	135.0
CNA441	2.3	0.0
EMB120	109.4	56.3
SA226	4.9	0.0
SF340	4.0	11.3
GENERAL AVIATION/MILITARY		
Large Jet	9.6	10.6
Small Jet	15.6	17.2
Large Multiengine	33.4	36.9
Small Multiengine	13.4	14.8
Small Single Engine	8.0	8.8
Total	1196.2	1320.3

Source: Transportation Solutions, Inc March 1999

Table Notes:

- 2007 fleet mix originally prepared for 2010. Total operations for 2007 is 97% of the 2010 operations. Considers trends in aircraft retirements and orders by major carriers at SFO.
- Annual average day operations, calculated as described in text.
- Zero values in Year 2007 are a result of the discontinuation of use of Stage 2 Aircraft operations and the retirement of certain other aircraft from service.
- 1997 and 2007 figures are the number of aircraft used to model the annual average day.



Source: ATAC

SFO
SOIA/PRM EA

No Action and Proposed Action Approach Tracks

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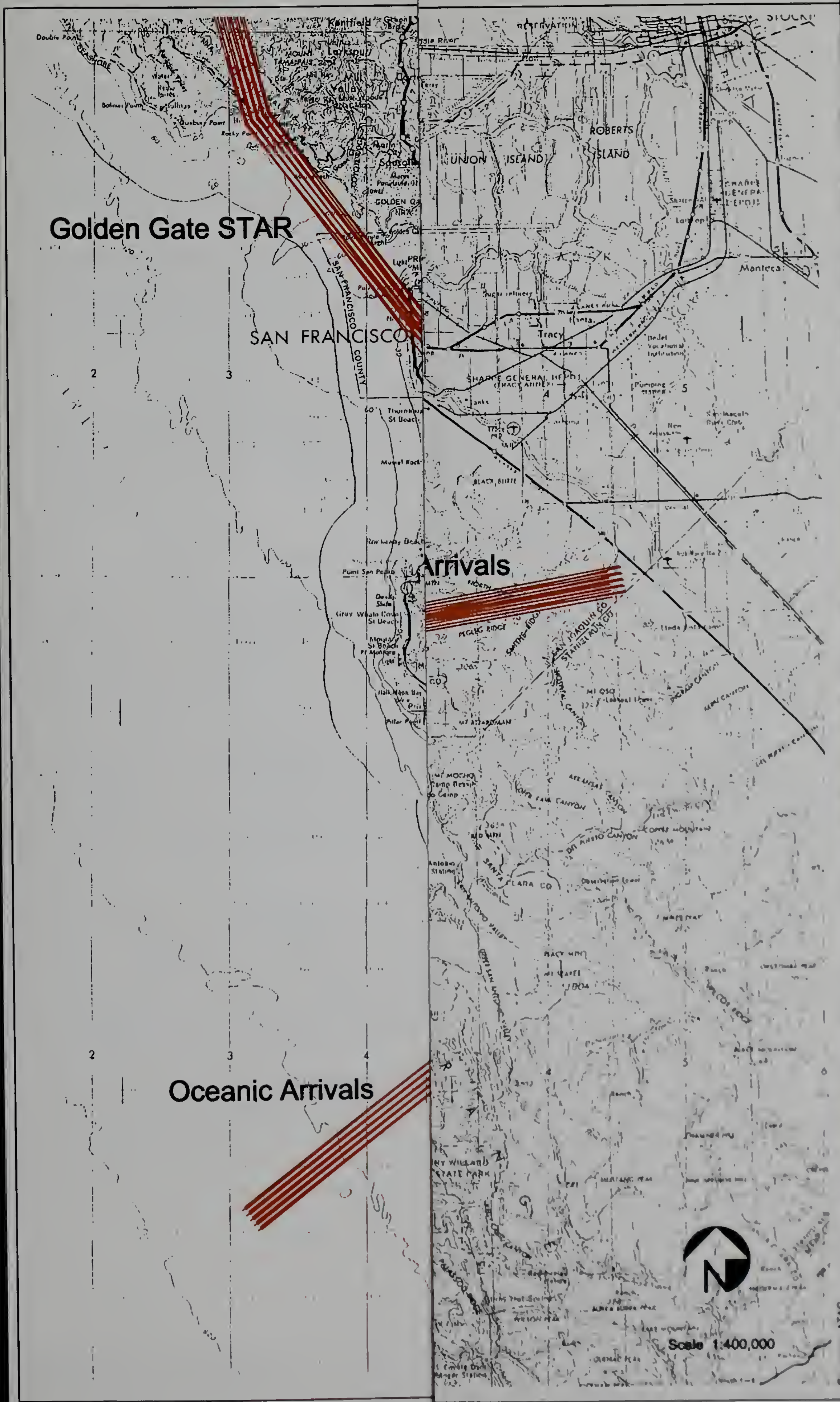
Figure 4.1-1



Source: ATAC

No Action Arrival Flight Track Centerlines

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Figure 4.1-2

SFO
SOIA/PRM EA

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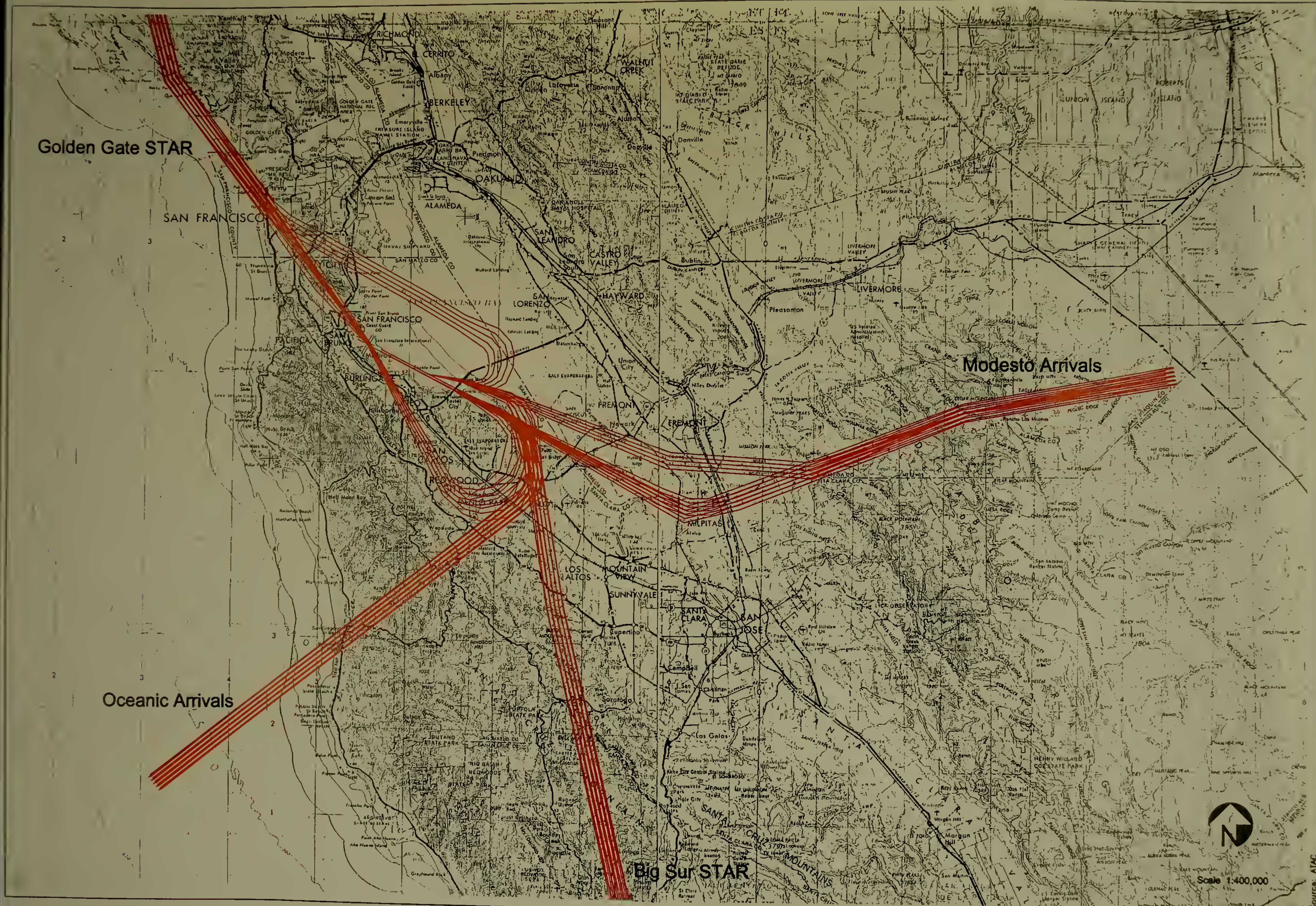

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Figure 4.1-2

No Action Arrival Flight Track Centerlines

SFO
SOIA/PRM EA

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To model the proposed SOIA procedure, two significant modeling assumptions were made, based on discussions with local FAA representatives from Bay TRACON, regarding use of the procedure:

- First, the SOIA and existing approaches would use a 16- to 19-mile final approach rather than the 7- to 10-mile final approach used today. A different starting point to the final approach would increase the altitudes of aircraft flying over populated areas, and would require slightly different routing than used today. The flight tracks for modeling the SOIA procedure are shown in Figure 4.1-3. For modeling purposes, it was assumed that all aircraft arriving at SFO from the north (except as noted in EA) and landing on runways 28L or 28R would use the full 16- to 19-mile final approach.

- Second, during the time that side-by-side approaches are being used for both visual and SOIA weather conditions, Runway 28R arrivals would use the proposed SOIA and ILS/PRM for course guidance. Currently, during side-by-side visual approach operations, aircraft on Runway 28R use the 095 radial of the SFO VOR/DME for course guidance.

4.1.1.4 Runway Assignment for Arrivals to the Runway 28 Pair

Flights landing at the Airport approach from the four cardinal directions (i.e., north, south, east, and west). Arrivals from the north are routed via the Golden Gate STAR (Standard Terminal Arrival), from the south via the Big Sur (BSR) STAR, from the east via the Modesto (MOD) Arrivals, and from the west via the Oceanic Arrivals intersection.

In general, air traffic controllers at Bay TRACON tend to route flights arriving from the east to land on Runway 28R, and flights arriving from the south on Runway 28L. In an attempt to reduce noise in the Foster City area, Runway 28R is the preferential arrival runway for the purpose of keeping the arrival flow over water and away from the noise sensitive land areas. However, the controllers cannot always accommodate this preference.

In VFR conditions, the Airport runs side-by-side arrivals to runways 28L and 28R. When weather conditions do not permit side-by-side landings (i.e., when cloud ceilings exist below 3,500 feet), controllers route aircraft “single stream” to Runway 28R. The SOIA procedure would allow controllers to run side-by-side landings to runways 28L and 28R more frequently than under existing conditions. From a noise modeling standpoint, this equates to a slightly larger number of aircraft assigned to Runway 28L on an annual average basis. In the appropriate weather conditions, two aircraft would either land (1) side-by-side on runways 28L and 28R under the Proposed Action alternative, or (2) single stream on Runway 28R under the No Action alternative. Table 4.1-2 shows the division of arrivals on runways 28L and 28R assumed for modeling both the Proposed Action and No Action alternatives, and for both side-by-side and single stream operations.

Table 4.1-2

Assumed Percent Use of Runways 28L and 28R

	1997			2007		
Runway	No Action	Proposed Action	Percent Increase	No Action	Proposed Action	Percent Increase
Side-by-side Operations						
28L	33.6%	37.1%	3.5%	32.7%	36.2%	3.5%
28R	37.4%	41.4%	4.0%	38.3%	42.3%	4.0%
Single Stream Operations						
28R	29.0%	21.5%	-7.5%	29.0%	21.5%	-7.5%
Total	100.0%	100.0%		100.0%	100.0%	

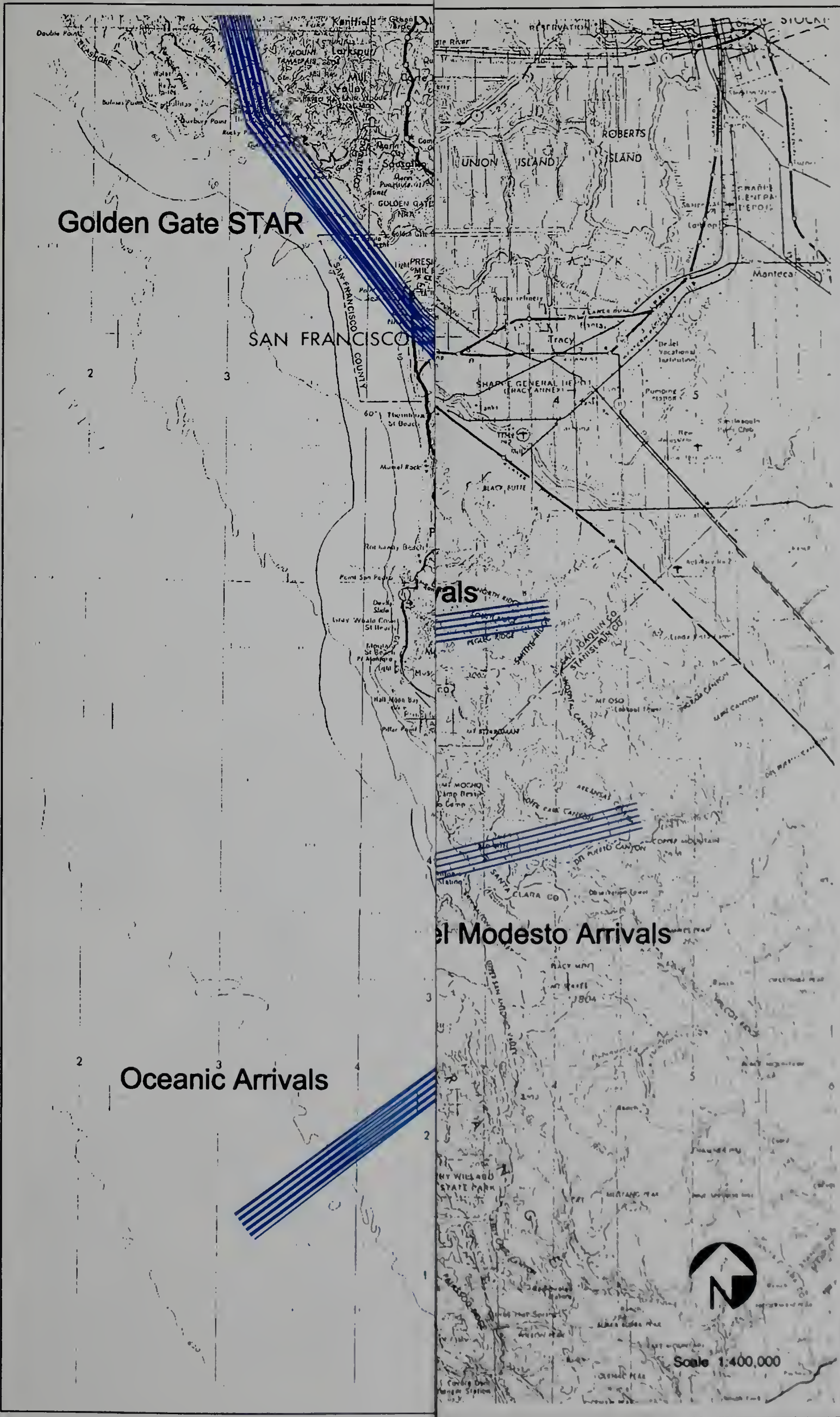
Source: ATAC January 2000

4.1.1.5 Effects of Proposed Project

The CNEL noise contours for the No Action alternative are shown in Figure 4.1-4 using the 1997 level of operations and fleet mix. The narrow contour along the approach path to runways 28L and 28R reflects the use of these runways for most of the arrivals at the Airport. Aircraft arrivals are generally conducted at lower engine thrust settings and therefore, on average, are less noisier than departures. The largest area of noise impact around the Airport occurs to the west, over the cities of San Bruno and South San Francisco. These noise impacts are primarily caused by departures from runways 28L and 28R. The other community impact area is located immediately off the south end of runways 1L and 1R; this noise is also caused primarily by departures using these runways. Since SOIA operations would only affect arrivals to runways 28L and 28R, the only changes to the noise contours would occur to the east of the airport under the approach path to runways 28L and 28R. As shown by the CNEL contour mapping, CNEL contour changes would not extend east beyond the San Mateo Bridge.

Figure 4.1-5 shows the Proposed Action alternative CNEL noise contours associated with the SOIA using the 1997 operations level and fleet mix.

Figures 4.1-6 and 4.1-7 show the CNEL noise contours for the No Action and Proposed Action alternatives using the 2007 level of operations and fleet mix. The basic shape of the contours are the same as for 1997 levels. However, the projected increase in aircraft activity is offset by the elimination of Stage 2 aircraft, with the result that the noise contours primarily caused by departing aircraft (i.e., north and west of the Airport) are actually smaller for 2007 than 1997. The noise contours under the approaches to runways 28L and 28R are not much different than those generated by the analysis of 1997 fleet mix and operations levels. For comparison purposes, Figures 4.1-8 and 4.1-9 show a view of the CNEL noise contour from both the No Action and Proposed Action alternatives using the 1997 and 2007 operations level respectively. As shown, the impact of the proposed procedure on the 65 dB CNEL noise contour would be minimal.



Source: ATAC

Proposed Action Arrival Flight Track Centerlines

Figure 4.1-3

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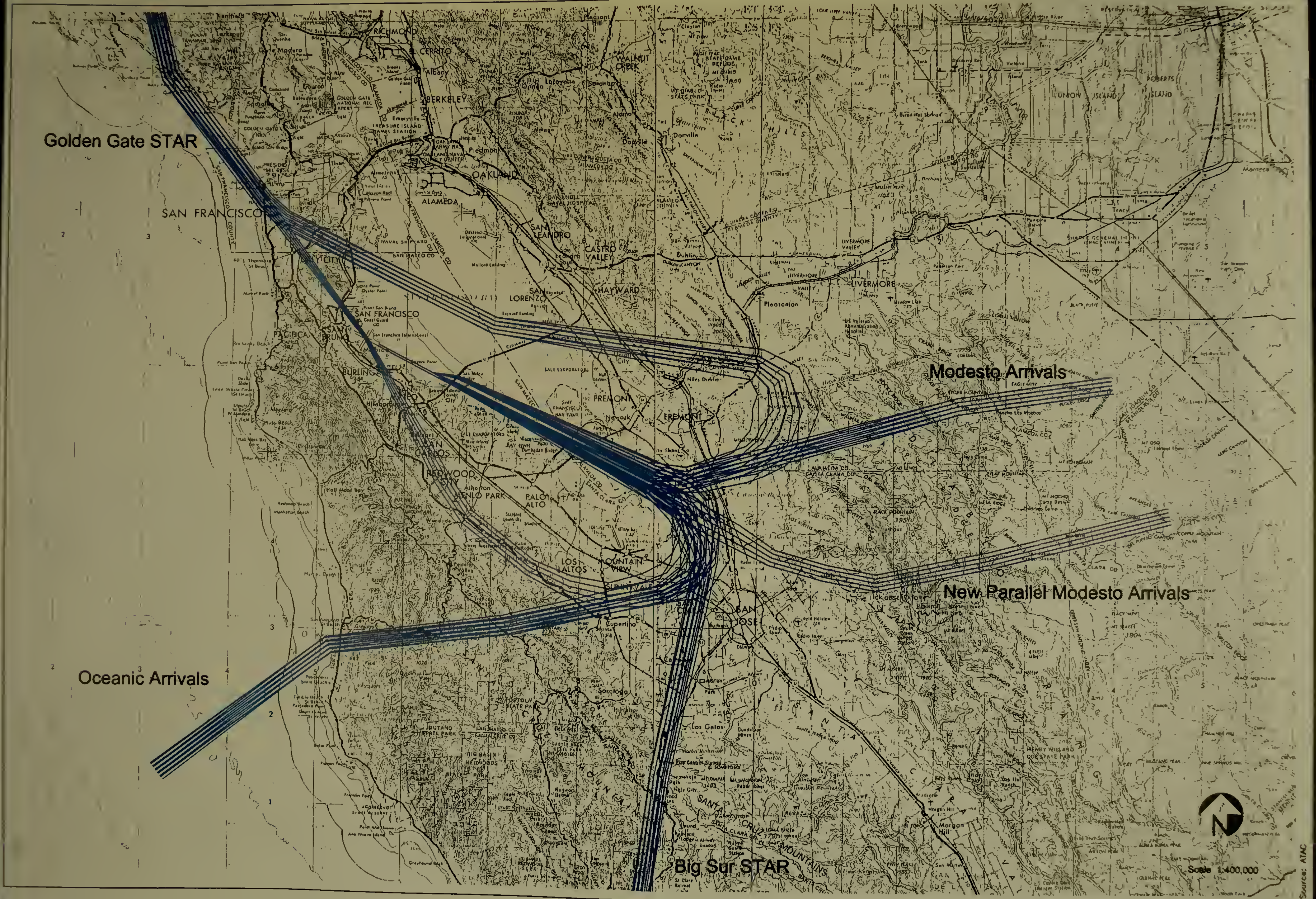

Source: ATAC

SFO
SOIA/PRM EA

Proposed Action Arrival Flight Track Centerlines

PARSONS
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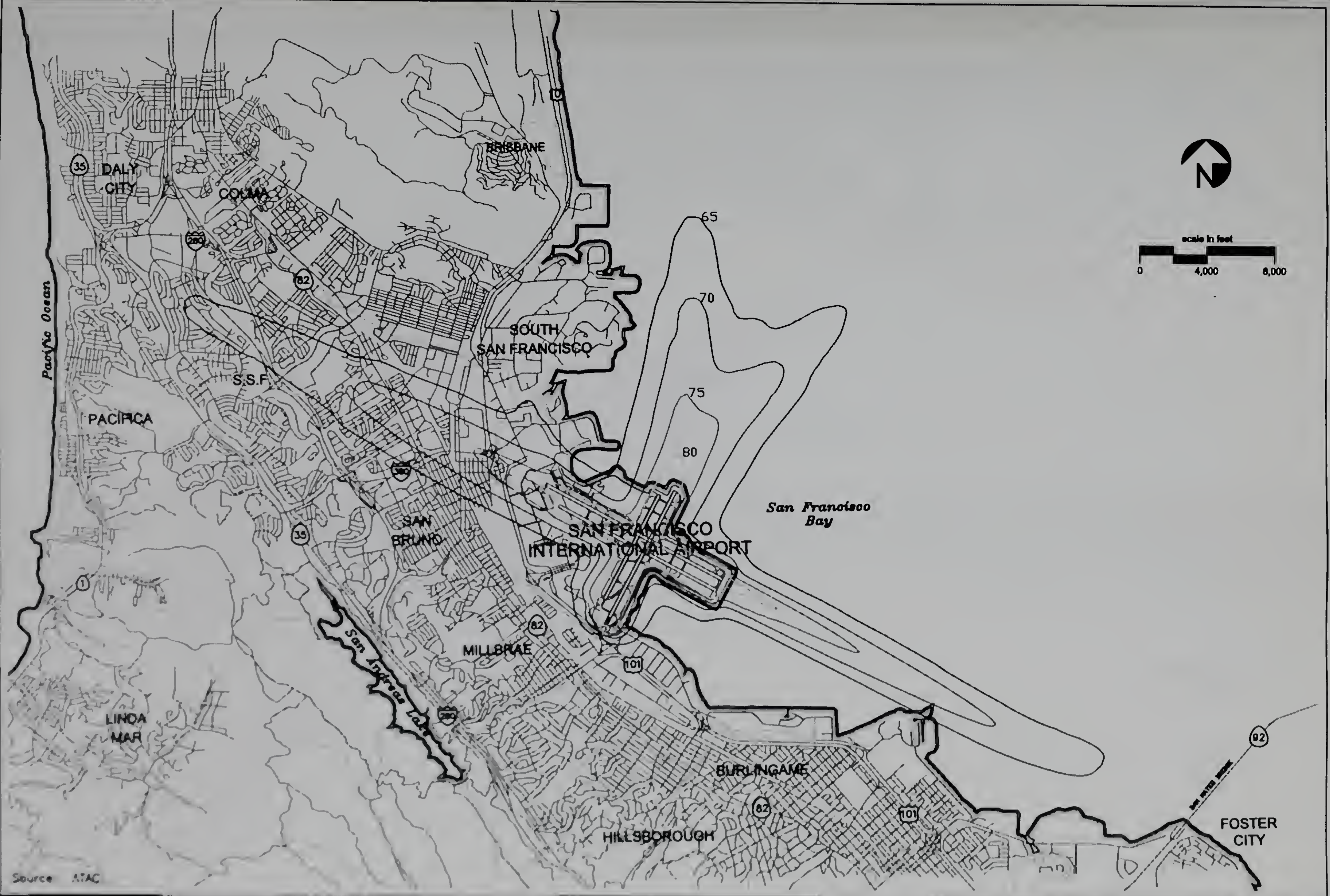
Figure 4.1-3

Date: 03/14/2000



Source: ATAC

SFO
SOIA/PRM EA

No Action Noise Contour
1997 Operations Level and Fleet Mix

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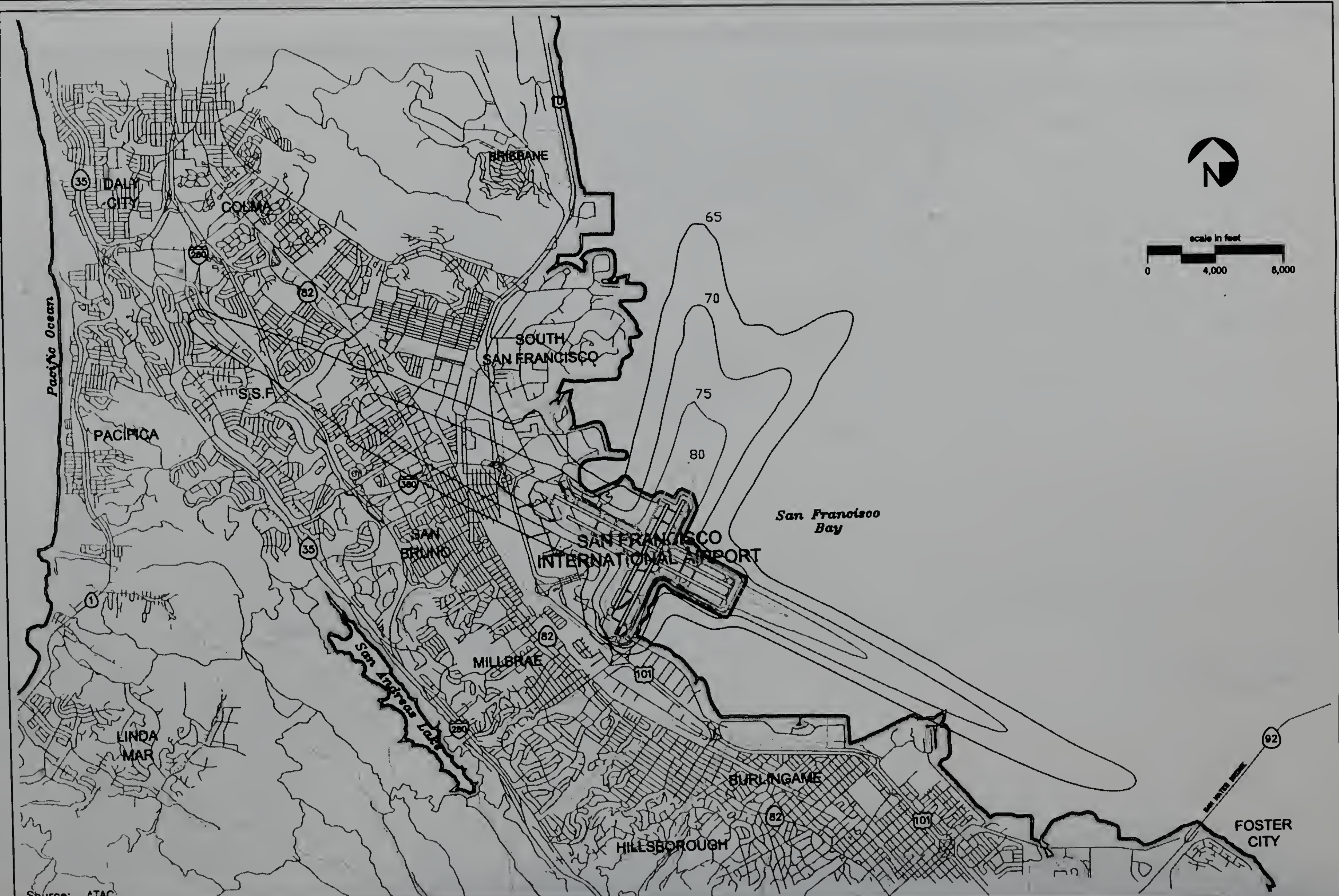
Figure 4.1-4

File: 736312\Graphics\Noise Date: 03/14/2000



Source: ATAC

SFO
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Proposed Action Noise Contour
1997 Operations Level and Fleet Mix

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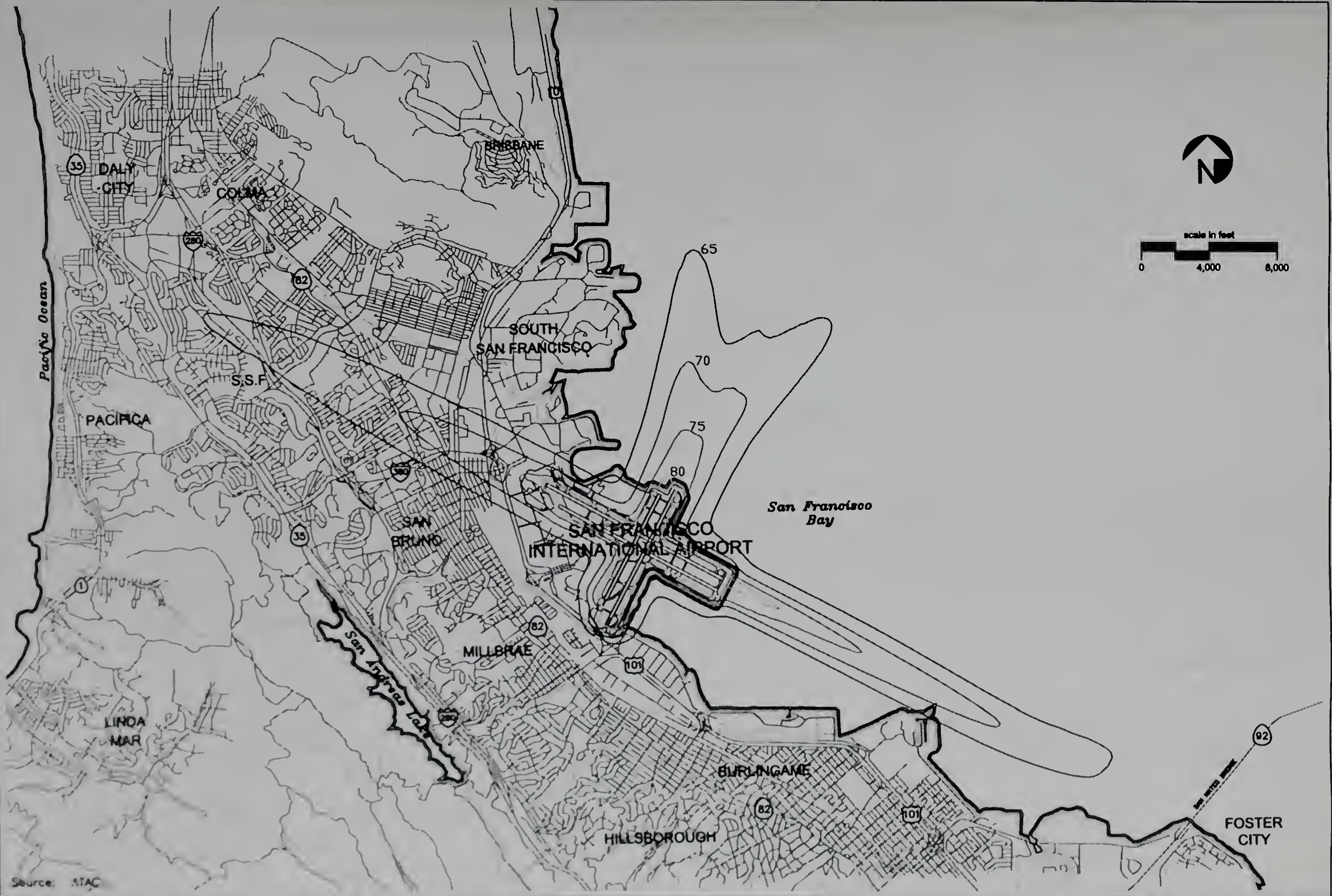
Figure 4.1-5



Source: ATAC

SFO
SOIA/PRM EA

No Action Noise Contour
2007 Operations Level and Fleet Mix

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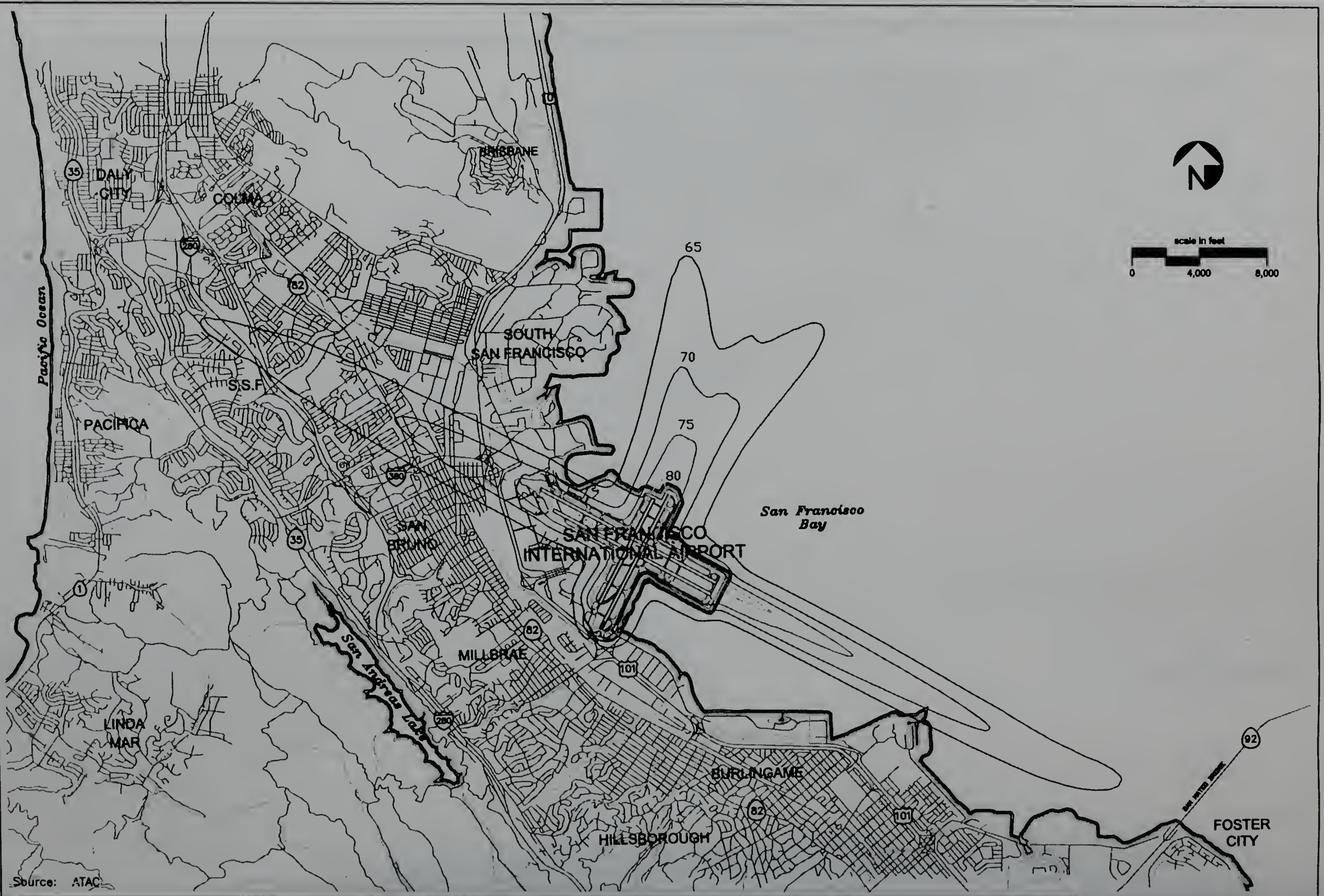
Figure 4.1-6



Source: ATAC

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Proposed Action Noise Contour
2007 Operations Level and Fleet Mix

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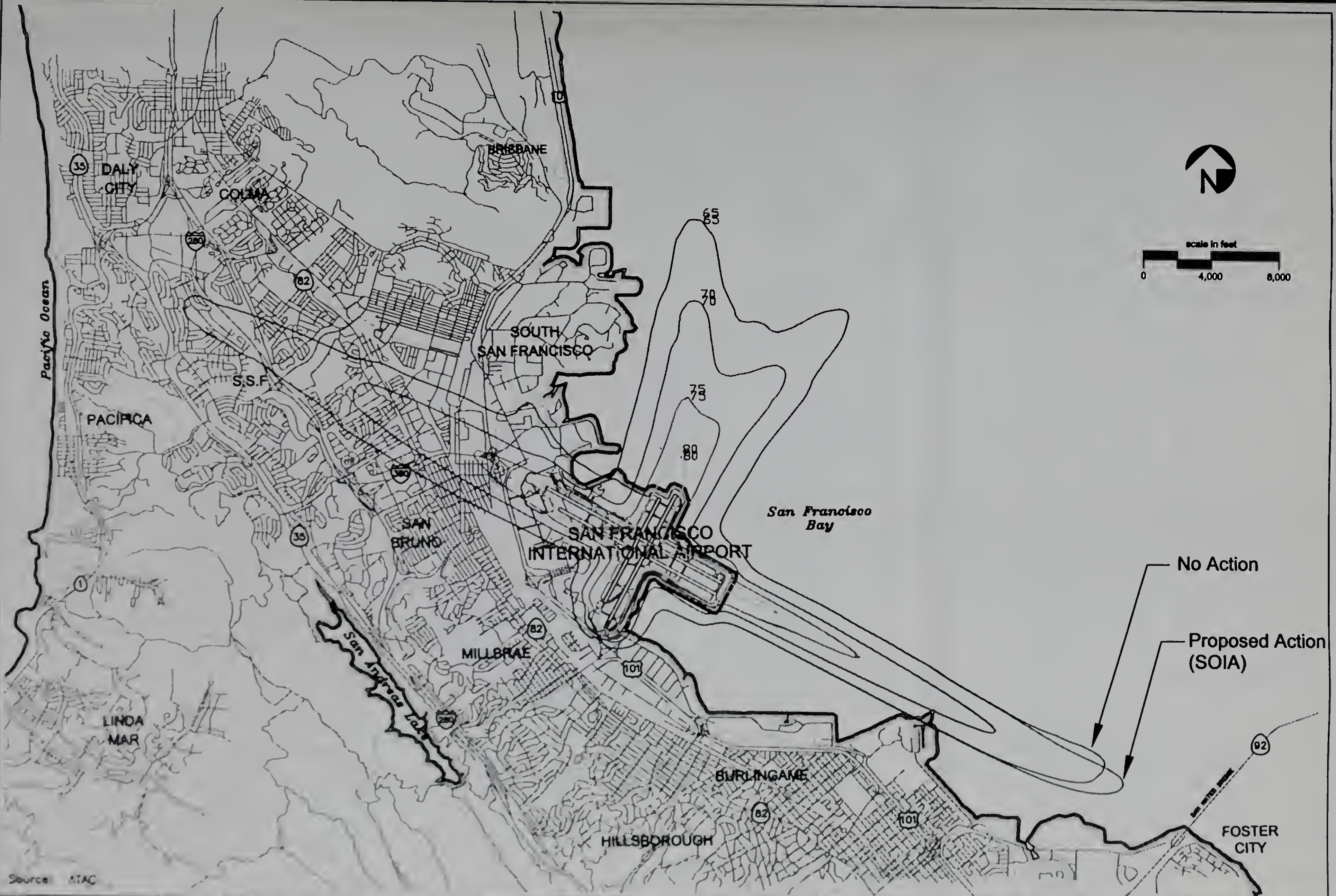
Figure 4.1-7



Source: ATAC

SFO
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No Action and Proposed Action Comparison of the Noise Contour
1997 Operations Level and Fleet Mix

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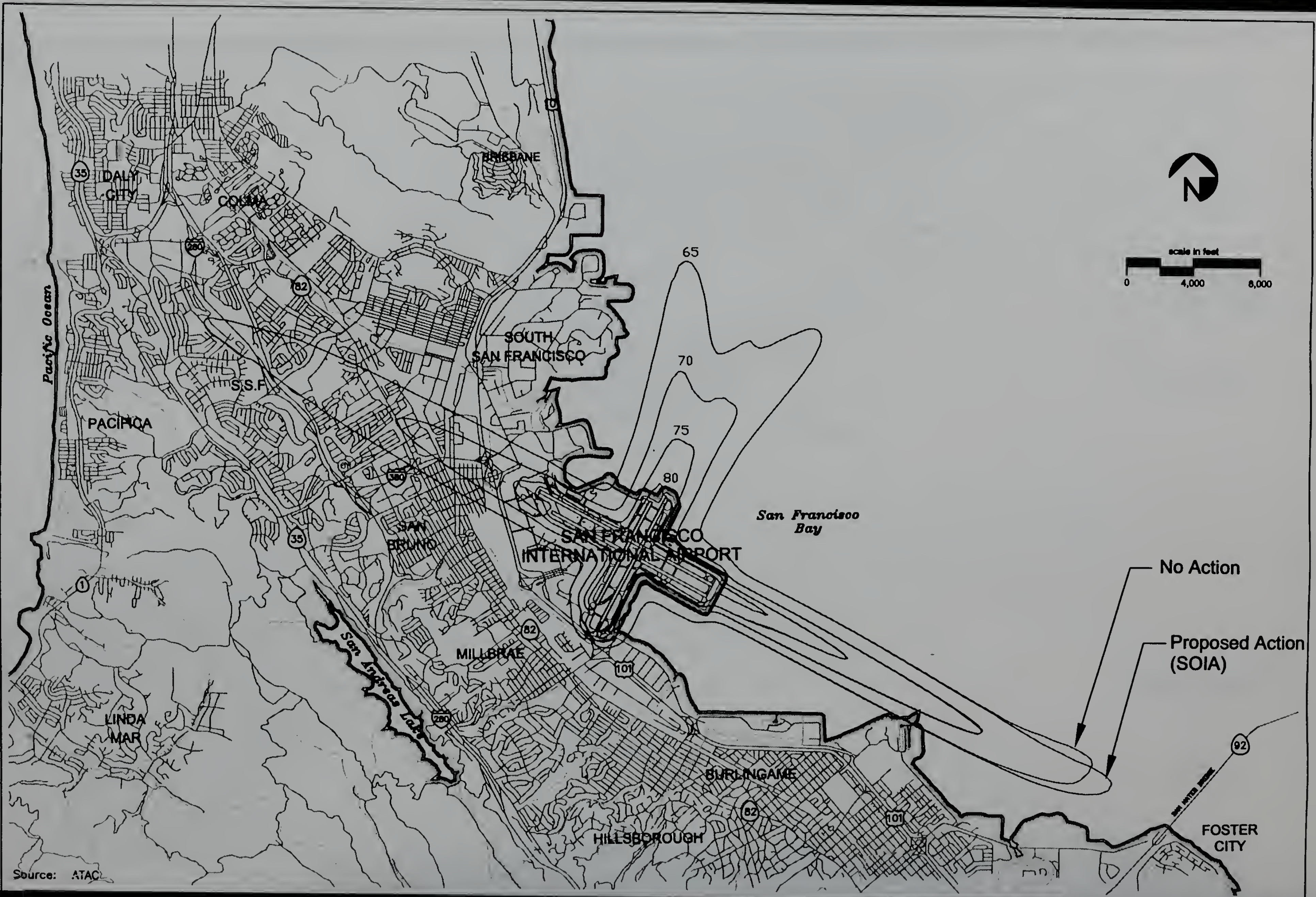
Figure 4.1-8



Source: ATAC

SFO
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No Action and Proposed Action Comparison of the Noise Contour
2007 Operations Level and Fleet Mix

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Figure 4.1-9

4.1.2 ISSUES

4.1.2.1 Community Noise Equivalent Level (CNEL)

Table 4.1-3 summarizes the effects to population units (based on U.S. Bureau of the Census 1990 Population and Housing Public Law 94-171 data) and land area that would occur as a result of implementing the No Action and Proposed Action alternatives. The effects are based upon changes to the 65 dB CNEL noise contour. Since the proposed SOIA procedure would be conducted over the water, the only resultant change in area to the 65 dB CNEL contour would occur over the water. Therefore, the number of people inside the contour would not change.

Table 4.1-3

Area and Population Affected by SOIA Procedure

	Population affected				Land Area, square miles			
Contour (dB)	1997 No Action	1997 Proposed Action (SOIA)	2007 No Action	2007 Proposed Action (SOIA)	1997 No Action	1997 Proposed Action (SOIA)	2007 No Action	2007 Proposed Action (SOIA)
65.0	17,865	17,865	14,327	14,327	13.26	13.33	11.02	11.09
70.0	4,564	4,564	2,005	2,005	6.35	6.36	4.70	4.70
75.0	396	396	-	-	2.62	2.62	2.04	2.04
80.0	-	-	-	-	1.24	1.24	1.07	1.07

Source: ATAC January 2000

In addition to noise contours developed by the INM model, ambient CNEL values were measured at five specific locations around the Bay area. These sites are shown on Figure 4.1-10 and the results of the monitoring are included in Appendix G. The results of the ambient noise monitoring indicate that typical background noise levels range from 56.2 to 61.3 in the urbanized south Bay area.

Table 4.1-4 provides a comparison of modeled noise at three existing noise monitoring locations (see Figure 4.1-10) that are located in the southeast Bay and peninsula communities. The proposed SOIA procedure, with its new final approach and feeder routes, would only moderately affect noise in locations on the peninsula south and east of the Airport, and other locations in the south and east Bay. These changes (between the No Action and Proposed Action) can be seen in the "Difference" column of Table 4.1-4. Noise change (impacts) for locations in San Francisco and the San Bruno Gap were calculated and found to be negligible.

Table 4.1-4

Calculated CNEL Values Using SFO Traffic for Noise Analysis Locations

		CNEL Calculations (dB) – 1997			CNEL Calculations (dB) - 2007		
INM Grid Point	City	No Action	Proposed Action (SOIA)	Diff.	No Action	Proposed Action (SOIA)	Diff.
M12	Foster City	59.6	59.5	(0.1)	59.8	59.7	(0.1)
L44	East end of Dumbarton Bridge	44.5	50.1	5.6	45.0	50.9	5.9
L34	West end of Dumbarton Bridge	48.0	36.5	(11.5)	48.2	36.5	(11.7)

Source: ATAC January 2000

Note:

- These CNEL levels are based only on SFO aircraft operations, and do not contain noise contributions from other sources, such as aircraft operating from other Bay Area airports, automobile traffic, and other background noise sources.
- Reference Figure 4.1-10 for the locations of the three INM Grid Points.

The overall noise impacts of the proposed SOIA procedure in Foster City (i.e., the closest residential area to the runways 28R and 28L final approaches) would be negligible. Even though the ILS localizer (course guidance) for the proposed SOIA procedure is slightly closer to Foster City than the SFO 095 degree radial (course guidance) used in the "Quiet Bridge" procedure, the amount of time during which side-by-side operations are used is extended. This effectively reduces the amount of time in which aircraft are single stream to Runway 28R and use the ILS localizer for course guidance.

The implementation of a 16- to 19-mile final approach path to facilitate the SOIA would be advantageous for communities on the peninsula. Aircraft over the peninsula would be turning from the downwind leg onto the final approach further east than in the existing procedure. As a result, over-flights of Menlo Park, Atherton, Redwood City, and Palo Alto would occur at higher altitudes (up to 2,000 feet) than they do in the existing arrival procedures.

The longer final approach path would result in an increase in overall noise at locations in the Cargill salt evaporator ponds and adjacent salt marshes of the Don Edwards National Wildlife Refuge southeast of the Dumbarton Bridge, where the final approach path begins. Noise calculated at a representative location near the east end of the Dumbarton Bridge indicates that noise due solely to SFO traffic may increase, however, (1) this increase would occur over uninhabited marshland and salt evaporator ponds, and (2) the area of impact is currently overflown by traffic from airports at lower altitudes than the SFO final approach. Therefore the additional impact of the SFO traffic on existing noise levels would be minimal.

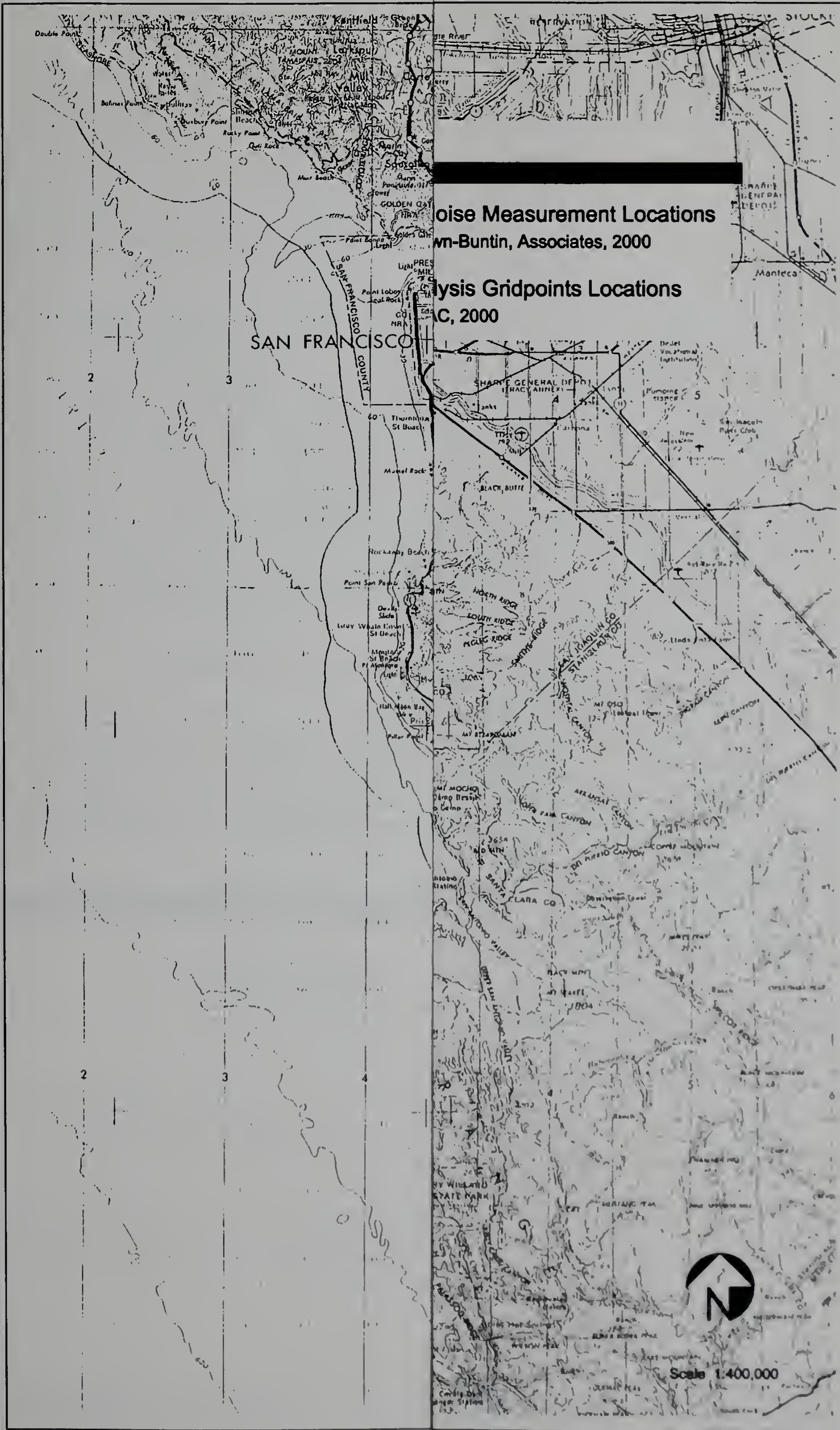

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Figure 4.1-10

Noise Analysis and Measurement Locations

SFO
SOIA/PRM EA

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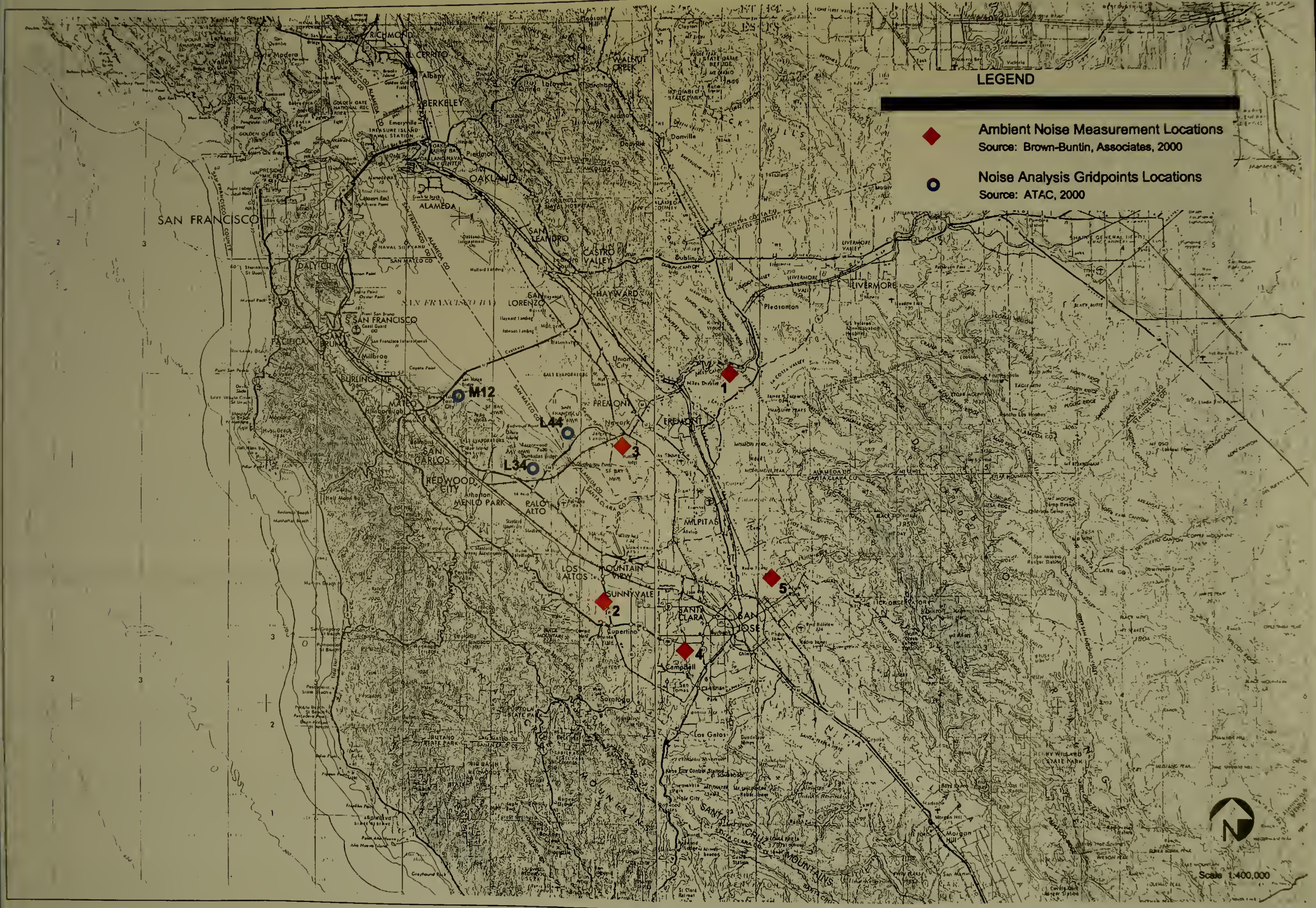

Noise Analysis and Measurement Locations

SFO
SOIA/PRM EA

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Figure 4.1-10

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For example, ambient CNEL (see Appendix G for more information on ambient noise measurements) in the area east of the Dumbarton Bridge is approximately 55 dB, the contribution from SFO traffic in the 2007 No Action alternative is calculated at 45.0 dB, and in the Proposed Action alternative it is calculated at 50.9 dB. Thus, the contribution of SFO traffic in the No Action alternative increases the CNEL from 55 dB to approximately 55.4 dB and the SFO traffic in the Proposed Action alternative increases the CNEL from 55 dB to approximately 56.4 dB. Thus, the change in SFO flight paths would cause an approximately one decibel increase in CNEL over the salt ponds.

Implementation of the Proposed Action would result in modifications to feeder routes that serve SFO. These modifications would locate planes over land uses that currently do not have SFO aircraft over-flights. However, in all cases, the altitude of aircraft in these locations would be greater than 6,000 feet above ground level (AGL). INM modeling has determined that the number of planes arriving at SFO via these feeder routes and at these altitudes would not result in aircraft over-flight noise impacts of greater than 45 dB CNEL. Ambient noise monitoring was performed in random locations beneath the feeder routes and determined that average ambient noise levels are in the range of 58 dB CNEL to 61 dB CNEL. As stated above, the addition of SFO aircraft noise in these locations would not result in an increase of more than 1 dB. Due to the high ambient noise levels, noise associated with aircraft over-flights would not be perceptible. Therefore, the potential impacts to land use would be less than significant and no mitigation measures are required.

4.1.2.2 Single-Event Noise Levels

While the CNEL at Foster City would change very little due to the proposed SOIA procedure on an annual average basis, calculations of the noise from a single aircraft event would be improved by use of the procedure. Table 4.1-5 shows the results of an analysis of a 747-400 using the proposed SOIA track to 28R instead of the 28R ILS calculated at SFO's noise monitoring station number 12 in Foster City (see Figure 4.1-10 for location of the noise monitor).

Table 4.1-5

Comparison of Single-Event Noise at Foster City M 12:
One 747-400 on SOIA vs. Current ILS Approach to Runway 28R

Noise Metric	No Action	Proposed Action (SOIA)	Single-event Reduction
Single Event Noise Exposure Level (dB)	86.2	76.9	9.3
Maximum Noise Level (dBA)	76.9	65.0	11.9

SOURCE: ATAC January 2000. Based on calculations made using the INM version 6.0

Notes:

- During SOIA operations, aircraft could land side-by side on runways 28L and 28R.
- SOIA operation would only minimally decrease CNEL.

4.1.3 CONCLUSIONS/MITIGATION MEASURES

4.1.3.1 Proposed Action

The use of proposed SOIA operations would be nearly equivalent in terms of aircraft noise on final approach to the existing SFO 095 degree radial (using the "Quiet Bridge" and/or "Tipp Toe" approach for side-by-side operations). Foster City would experience a decrease (-0.1) in annualized CNEL levels. Therefore, CNEL noise impacts associated with the implementation of SOIA would be considered less than significant.

The longer final approach path associated with the SOIA procedure means that aircraft would be higher (up to 2,000 feet) than they currently are when starting their final approach. While the beginning of the final approach would be located farther to the south than under the existing conditions, aircraft in these locations would be higher and therefore producing less noise to these communities. Therefore, noise impacts associated with the modified feeder routes would be considered less than significant.

Implementation of the Proposed Action alternative would result in a less-than-significant increase in CNEL levels as perceived by the surrounding communities. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on noise.

4.1.3.2 No Action

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on noise.

4.2 COMPATIBLE LAND USE

4.2.1 METHODS FOR ANALYZING IMPACTS

FAA Order 1050.1D, Attachment 2, Paragraph 3 states that "the compatibility of existing and planned land uses in the vicinity of an airport is usually associated with the extent of noise impacts related to that airport." If a project would result in other significant impacts having land use implications, the effects on land use may be described under the appropriate impact sections. Specific impacts of Project-related noise on surrounding land uses is discussed in Section 4.1, Noise, of this EA.

4.2.2 ISSUES

Project-related land use impacts in the vicinity of SFO are primarily associated with noise exposure from an increase in aircraft operations or a change in flight path. The primary issues are the changes in on-Airport land uses and the compatibility of each of the alternatives with adjacent land uses. In this section, the analysis of impacts is based on a review of land use and zoning maps of those areas of cities that would be affected by new SOIA feeder routes, and applicable FAA noise and land use compatibility guidance.

4.2.3 CONCLUSIONS/MITIGATION MEASURES

4.2.3.1 Proposed Action

Implementation of the Proposed Action would result in modifications to feeder routes that serve SFO. These modifications would locate planes over land uses that currently do not have SFO aircraft over-flights. However, in all cases, the altitude of aircraft in these locations would be greater than 6,000 feet above ground level (AGL). INM modeling has determined that the number of planes arriving at SFO via these feeder routes and at these altitudes would not result in aircraft over-flight noise impacts of greater than 45 dB CNEL. Ambient noise monitoring was performed in random locations beneath the feeder routes and determined that average ambient noise levels are in the range of 58 dB CNEL to 61 dB CNEL. As discussed in Noise (4.1.2.1), the addition of SFO aircraft noise in these locations would not result in an increase of more than 1 dB. Due to the high ambient noise levels, noise associated with aircraft over-flights would not be perceptible. Therefore, the potential impacts to land use would be less than significant and no mitigation measures are required.

4.2.3.2 No Action

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on land use.

4.3 SOCIAL

4.3.1 METHODS FOR ANALYZING IMPACTS

SFO is a major employer in San Mateo County. However, the Proposed Action would not result in any changes to employment at SFO, nor related offsite employment. In addition, the Proposed Action would not result in any physical changes that would result in the relocation of businesses or residents.

Detailed construction plans are not available for the Proposed Action. Therefore, construction traffic effects are addressed at a general level of detail.

4.3.2 ISSUES

The Proposed Action would not generate additional traffic to regional freeways or local arterials serving the Airport. However, additional traffic would be generated during Project construction for site preparation, earthwork and fill. Delivery of construction materials, and construction vehicle and worker trips would also generate additional traffic.

4.3.3 CONCLUSIONS/MITIGATION MEASURES

4.3.3.1 Proposed Action

Employment

The Proposed Action represents an improvement in existing runway infrastructure and airspace use that would not change Airport employment needs.

The Proposed Action alternative would not result in the relocation of businesses or residences, nor the generation of any employment. The Proposed Action is an operational modification and not an expansion of services. The Proposed Action will not alter surface transportation patterns, divide or disrupt established communities, or disrupt orderly planned development. No impacts would occur and no mitigation measures are required.

Circulation and Traffic

After completion, the Proposed Action is not expected to generate new vehicle traffic to local roadways or the regional freeway system.

Construction Access

The Proposed Action would include the construction of a Localizer/DME, glide slope, and PRM. The schedule for construction of the PRM would start in July 2000 with completion of the tower and shelters by November 2000. Construction of the Localizer/DME and glide slope would require approximately 35 to 45 days (assuming 8 hours of work each day) starting in July/August 2000 and ending in September 2000.

During construction, all equipment would be stored on site, west of the Field Lighting No. 2 area, and would not be transported on the road network on a daily basis. Each construction site would require an estimated three to four pickup trucks for construction personnel and engineers. Currently, it is expected that construction would take place on all of the Localizer/DME and glide slope sites concurrently.

The Localizer/DME would involve construction of an eight element array. Each element is approximately five feet high, accompanied by a concrete pad measuring 9 feet by 48 feet. Construction of the Localizer/DME would require a crane on-site for two days. The glide slope would be approximately 50 feet tall with a triangular base of two to three feet. Its location would be about 480 feet from the centerline of 28R and 20 feet farther from the runway than the nearest existing glide scope. Construction of the glide slope would also require a crane on-site for two days.

SFO estimates that a maximum of 100 cubic yards of fill or excavated material would be required for the PRM tower foundation and other site preparation activities. During this phase of construction, there would be an average of 9 to 12 truck trips per day to the PRM site. The actual number of truck trips from off-site locations could be considerably less, if stockpiled construction material from current SFO Master Plan construction projects are used.

Approximately 9 to 12 pick-up trucks per day would access each of the Localizer/DME and glide slope sites via the roadway network throughout the 30-45 day construction period. Three backhoes and two cranes would be required for Project construction, and would access the site via the local road network. South Airport Boulevard and North Access Road would be the primary connector between US 101/I-380 and the construction sites because it provides the most direct access to the site from US 101 and the external road system. Although no road closures are anticipated to occur as a result of Project construction, any movement of heavy construction equipment from 7:00 am to 9:00 am or from 4:00 pm to 6:00 pm would coincide with peak period traffic and could temporarily worsen service levels at major SFO intersections. The addition of 9 to 12 truck trips per day per site for the Proposed Action would represent a minor increase in traffic on the local roadway and regional freeway network.

Overall, the impact of construction–related traffic would be temporary, creating intermittent lessening of capacity on access streets and haul routes due to the slower movements and larger turning radii of construction vehicles. These impacts, however, are expected to be temporary and minor as all construction equipment would be stored on site throughout the duration of the construction period.

Recommended mitigation measures to avoid traffic impacts include the following. SFO should develop a plan to transport heavy construction equipment (i.e., backhoes and cranes) at the beginning and end of the construction period to minimize impacts on peak hour traffic on Airport roadways. SFO should require contractors to implement additional traffic controls, such as flaggers and signals to direct traffic, avoid congestion and minimize vehicle conflicts. SFO should also coordinate with other construction projects at Airport facilities to determine if existing construction equipment could be used for the Project to avoid transporting of heavy equipment on the local road and freeway network. Implementation of these standard traffic control measures would reduce the potential construction-related impacts to a less than significant level.

4.3.3.2 No Action

Implementation of the No Action alternative would result in no changes to employment or transportation from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on businesses, residences or the transportation system.

4.4 INDUCED SOCIOECONOMIC

Implementation of the Proposed Action would not result in induced socioeconomic impacts and no mitigation measures are required.

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have a socioeconomic impact.

4.5 ENVIRONMENTAL JUSTICE

4.5.1 METHODS FOR ANALYZING IMPACTS

Government agencies must comply with Executive Order 12898, signed by President Clinton on February 11, 1994, which stipulates that ensuring environmental justice should be part of their mission. Executive Order 12898 states that agencies would identify and address the human and environmental effects their programs, policies, and activities have on minority and low income people by 1) promoting efficient enforcement of environmental statutes in areas with high populations of minority and low income residents, 2) ensuring greater public participation, 3) improving research and data collection relating to minority and low income populations, and 4) identifying differential patterns of consumption of natural resources among minority and low income populations.

The Department of Transportation (DOT) Order 5610.2, Environmental Justice was issued to comply with Executive Order 12898 on April 15, 1997. FAA uses DOT Order 5610.2 as a guideline for analyzing environmental justice issues. The DOT defines a low-income person as an individual whose income is at or below the poverty level. Minorities are defined as individuals or populations who are considered in the black, Asian/Pacific Islander, or American Indian/Alaskan Native racial categories, or individuals of Hispanic origins.

In response to Executive Order 12898, DOT provides guidance for an Environmental Assessment in Appendix 1.g of DOT Order 5610.2.

> Disproportionately high and adverse effect on minority and low-income populations means an adverse effect that:
>
> 1) is predominantly borne by a minority population and/or a low-income population, or
> 2) would be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude that the adverse effect that would be suffered by the non-minority population and/or non-low-income population.

Areas where the minority population exceeds 50 percent or meaningfully exceeds that of the general population are considered significant for the purpose of this analysis. Low-income is determined based on median household income being at or below poverty level.

4.5.2 ISSUES

Issues of particular concern for Airport projects are acquisition of land and displacement of people and noise impacts on adjacent neighborhoods. The Project does not include any acquisition of land. Therefore, this environmental justice analysis focuses on potential noise impacts on minority and low-income residents.

4.5.3 CONCLUSIONS/MITIGATION MEASURES

4.5.3.1 Proposed Action

The Proposed Action would result in changes to flight patterns. These changes primarily include new approaches from the south and east of runways 28L and 28R. However, the modifications that would occur to the feeder routes as a result of the Proposed Action would occur at elevations above 6,000 feet. The noise impact in these locations would be significantly lower than FAA's 65 CNEL significance threshold. Therefore, implementation of the Proposed Action alternative would not have an impact on minority and low-income populations.

Despite the lack of significant noise impact, it is possible that south bay residents may experience a perceived impact from an increase in aircraft flying overhead. This impact is not stipulated against under the Executive or DOT Order. However, in order to determine if there are any concerns associated with the perceived increases in background noise levels, FAA conducted public outreach using a Scoping Memorandum for south bay communities as well as the adjacent SFO communities. Section 1.9 provides a description of the public outreach conducted for the Proposed Action.

4.5.3.2 No Action

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on environmental justice.

4.6 AIR QUALITY

4.6.1 METHODS FOR ANALYZING IMPACTS

4.6.1.1 Construction

Construction emissions are generally temporary in nature. PM_{10} is the main pollutant generated during construction from dust disturbed by the equipment. While estimates of emissions from construction can be calculated, the BAAQMD approach to CEQA analyses emphasizes implementation of effective and comprehensive control measures (BAAQMD 1996). Table 4.6.1 summarizes the measures of control for construction emissions of PM_{10}.

Table 4.6-1

Feasible Control Measures for Construction Emissions of PM_{10}

Basic Control Measures - The following controls should be implemented at all construction sites.

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets

Enhanced Control Measures - The following measures should be implemented at construction sites greater than four acres in area.

- All “Basic” control measures listed above.
- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).
- Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.)
- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.

Optional Control Measures - The following control measures are strongly encouraged at construction sites that are large in area, located near sensitive receptors or which for any other reason may warrant additional emissions reductions.

- Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.
- Install wind breaks, or plant trees/vegetative wind breaks at windward side(s) of construction areas.
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph.
- Limit the area subject to excavation, grading and other construction activity at any one time.

Source: BAAQMD. 1996.

Construction equipment emits other pollutants as well, but these emissions are included in the BAAQMD emission inventory that has been developed for air quality planning and are not expected to affect the attainment or maintenance of ozone and carbon monoxide standards in the Bay Area (BAAQMD 1996).

4.6.1.2 Operation

The effects of SOIA operations on the number of flights, and consequently the potential increase or decrease in airplane emissions will be qualitatively described.

The BAAQMD Rules and Regulations will be searched to assess what permitting if any would be required for the emergency generator.

4.6.2 ISSUES

The air quality issues considered with the addition of the proposed SOIA and ILS/PRM include potential emissions during construction of the facility. Operational impacts to be considered include potential changes in the number of flights at the Airport. Additionally, an emergency power generator would be added to the site.

4.6.3 CONCLUSIONS/MITIGATION MEASURES

4.6.3.1 Proposed Action

Construction

Fugitive dust (i.e., PM) would be emitted during excavation, and grading of the site. Construction emissions would be temporary. The areas to be disturbed for the construction of the equipment and supporting structures would be very small, less than one acre. The "Basic" control measures described in Table 4.6-1 should be followed as mitigation measures.

The equipment used during construction would also emit air pollutants, including nitrogen oxides (NO_x), CO, SO_2, hydrocarbons (HC), and PM. However, construction emissions are already included in BAAQMD regional planning guidelines and are not expected to impede the attainment or maintenance of air quality standards (BAAQMD 1996).

Operation

The implementation of the proposed SOIA operations would not increase the number of flights expected at the Airport. Consequently, the Project would not be expected to increase air emissions associated with aircraft. Most likely, the Project would reduce emissions on those days it is in use, because flights delays would be reduced, which would reduce the backup of aircraft on the runways, and reduce air emissions during idling. Based on past weather conditions, the SOIA operations are expected to be used approximately 7.5 percent of the time. Therefore, the Proposed Action would not be expected to have an effect on air quality either positively or negatively.

Federal Regulations at 40 CFR 51.853(b) require a conformity determination for federal actions that would result in the emission of air pollutants that exceed specified levels. However, a conformity determination is not required for federal actions resulting in de minimis air emissions (Federal Register, 1993). Under FAA Order 5050A, an air quality analysis is not required for the Proposed Action as no change to established air traffic capacity or frequency of aircraft operations would result from implementation of the Proposed Action. The purpose of the Proposed Action is the reduction of delay.

The standby generator would emit air pollutants, including NO_x, CO, SO_2, HC, and PM. The engine is rated at 125 kilowatts (KW). The generator would be used in the event of a power outage. Additionally, it would be run one or two days per month for maintenance and testing. Overall, the generator would be used less than 30 days per year which, as described in Regulation 2-1-113.2.10, would exempt it from permits from the BAAQMD (BAAQMD 1999). Therefore no impact would occur and no mitigation measures would be required.

4.6.3.2 No Action

Under the No Action alternative, there would be little impact on air quality. Construction emissions would be eliminated. During inclement (poor) weather, use of the proposed SOIA and ILS/PRM may have a slight benefit in air quality that would not occur if the No Action alternative were selected.

4.7 WATER QUALITY

4.7.1 METHODS FOR ANALYZING IMPACTS

The President's Council on Environmental Quality Regulations under NEPA requires that water quality impacts be evaluated with respect to the Project's ability to meet state water quality standards and any federal, state, and local permit requirements. Significant impacts on water quality for most Airport actions can typically be avoided by design considerations, construction phase controls, and other mitigation measures. Exceedance of water quality standards and water quality problems that cannot be avoided or satisfactorily mitigated would be identified as significant impacts. For purposes of this document, significant effects on water quality would:

- alter surface water quality, including, but not limited to, temperature, dissolved oxygen, or turbidity, or substantially degrade water quality;
- substantially degrade or deplete groundwater resources;
- cause substantial erosion, or siltation; or
- change absorption rates or the rate and amount of surface runoff.

4.7.2 ISSUES

As a means of complying with federal regulations, all spills of petroleum products that have the potential to reach waterways and are of sufficient volume to create a visible sheen on the water must be reported to the Airport Management and the U.S. Coast Guard. A discharge of oil or hazardous substance (i.e., jet fuel, gasoline) is classified as a spill when the material enters a navigable waterway. A discharge that is contained and does not reach a navigable waterway is not considered a spill under Environmental Protection Agency reporting requirements.

Local and state agencies such as the Regional Water Quality Control Board regulate water quality standards and issue permits in accordance with the provisions of the Clean Water Act of 1977 and applicable state laws. The Proposed Action would result in the construction of new impervious surfaces that could affect absorption rates. In order to ensure no impact to existing drainage facilities, the project-specific design of each new facility must account for the modifications to site drainage.

4.7.3 CONCLUSIONS/MITIGATION MEASURES

4.7.3.1 Proposed Action

The Proposed Action would require ground excavation for the construction of the PRM, Localizer/DME, and glide slope facilities. The excavation would provide for concrete slab foundations and would not require deep pile construction. The lack of deep pile construction would eliminate the potential for ground water impacts.

During construction, and prior to the stabilization of the construction sites, the potential exists for increased sedimentation associated with construction disturbance areas. Sediments released from disturbed soils during storm water runoff could affect the water quality of adjacent surface waters. However, the use of standard construction erosion control measures would effectively reduce the potential water quality effects of ground disturbing activities. These standard measures include the use of sediment barriers (straw bales or filter fabric) and revegetation/soil stabilization following the completion of construction activities.

Results of the PRM Site Assessment (LEE/BC, 1999) indicate that the fill material that underlies the PRM site meets non-hazardous criteria of CCR Title 22 (Table 1). Metal concentrations of the fill composite sample were at background levels for the Airport. In addition, the laboratory reported no detectable levels of TPHg, BTEX, VOCs, SVOCs, Pesticides, or PCBs above the detection limits. Extractable TPH (quantified as 1,300 mg/kg TPHmo) was detected in the fill composite sample, but it likely represents an asphalt-derived compound. Therefore, based upon the results of the site assessment and the use of standard construction erosion control measures, the potential impacts to water quality are considered to be less than significant. No mitigation measures other than the standard construction erosion control measures would be required.

4.7.3.2 No Action

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required.

4.8 DEPT. OF TRANSPORTATION ACT, SECTION 4(F)

4.8.1 METHODS FOR ANALYZING IMPACTS

Section 4(f) of the Department of Transportation Act (40 U. S. Code 303) provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly owned lands. The Proposed Action would not result in the acquisition or development of any non-SFO lands.

4.8.2 ISSUES

Federal and state lands would be overflown under modifications to feeder routes included in the Proposed Action.

4.8.3 CONCLUSIONS/MITIGATION MEASURES

4.8.3.1 Proposed Action

The Proposed Action would result in modifications to feeder routes in the south bay area that would result in overflights of national wildlife refuges. Both the Don Edwards San Francisco Bay National Wildlife Refuge and San Francisco State Fish and Game Refuge would be overflown by aircraft using modified feeder routes associated with the operation of SOIA. According to noise analysis included in Section 4.1 of this EA, aircraft noise would increase by approximately 5 dB in the area of the Don Edwards Refuge. However, this increase would result in aircraft noise of approximately 50 dB CNEL. Ambient noise levels in this area are approximately 55 dB CNEL and would only increase by approximately 1 dB as a result of new aircraft noise. Based upon these values, noise effects are not considered to be significant, and therefore, potential impacts to the Refuge are also considered to be less than significant. No adverse impacts would result and no mitigation measures are required.

4.8.3.2 No Action

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on transportation.

4.9 HISTORIC, ARCHITECTURAL, AND ARCHAEOLOGICAL RESOURCES

4.9.1 METHODS FOR ANALYZING IMPACTS

The Criteria of Effect and Adverse Effect, as defined in 36 CFR 800.9 are used to evaluate an undertaking's effect on a historic property. The Criteria state that "an undertaking has an effect on a historic property when the undertaking may alter the characteristics of the property that may qualify the property for inclusion in the National Register" and "when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." Historic and archaeological data from the SFO Master Plan EA of 1998 was used to document existing conditions within the area of potential affect for the Proposed Action (see Section 3.9).

4.9.2 ISSUES

FAA undertakings that may affect cultural resources are governed by the National Historic Preservation Act of 1966, as amended, through the implementing regulations set forth by the Advisory Council on Historic Preservation in 36 CFR Part 800. Pursuant to this law, a significant impact would occur if the Project results in an adverse effect to a property that is listed in or eligible for inclusion in the National Register of Historic Places (NRHP).

The State Historic Preservation Officer (SHPO) was notified of the Proposed Action by receipt of the scoping memo, "Notice of the Proposed Action and Preparation of Environmental Assessment for Simultaneous Offset Instrument Approach (SOIA)/Precision Runway Monitor

(PRM) Project", in December 1999. The SHPO comments to the Scoping Memo are provided in Appendix D. The FAA's determination letter to the SHPO is located in Appendix F.

4.9.3 CONCLUSIONS/MITIGATION MEASURES

4.9.3.1 Proposed Action

The potential for archaeological resources to exist within the Project site is remote because the ground-based equipment sites are built substantially on fill materials. No historical sites or structures that are listed or eligible for listing on the NRHP are located within the Project area. Photographs of the proposed ground based equipment sites clearly show the human-altered conditions of the site/area (Figure 1-6).

The thickness of the artificial fill at SFO varies and on average ranges from approximately 8 to 16 feet. While it is possible that subsurface archaeological deposits could be encountered if construction activities were to extend beneath the artificial fill, it is unlikely that construction for the PRM, Localizer/DME, or glide slope would extend below 8 feet in depth.

If subsurface archaeological or historical remains are discovered during construction, work in the area shall stop immediately and a qualified archaeologist shall be consulted to make a determination of eligibility before construction continues. If human burials are encountered, all work in the area would stop immediately and the San Francisco County coroner's office shall be notified immediately. If the remains are determined to be Native American in origin, both the Native American Heritage Commission and any identified descendants must be notified and recommendations for treatment solicited (California Health and Safety Code Section 7050.5; California Public Resources Code Section 5097.94 and 5097.98). Implementation of this standard mitigation measure would reduce the potential impact to a less than significant level.

4.9.3.2 No Action

No archaeological or historical sites or structures that are listed or eligible for listing on the NRHP are located within the Project area. Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required.

4.10 BIOTIC COMMUNITIES

4.10.1 METHODS FOR ANALYZING IMPACTS

Projects would have significant impacts on biological resources when either of the following occurs: input from the U.S. Fish and Wildlife Service and the California Department of Fish and Game indicates that substantial, project-induced damage to wildlife cannot be mitigated to minimal levels, or the analysis indicates that substantial adverse impacts cannot be mitigated to the satisfaction of the resource agencies.

Pursuant to the Federal Endangered Species Act (Sections 7[a][3] and [4]), every federal agency is required to confer with the Secretary of the Interior (or of Commerce in certain instances) on any action likely to jeopardize the continued existence of a listed or proposed species or adversely affected the critical habitat of those species. A significant impact to a threatened or endangered species is defined as one that would adversely affect listed species or critical habitat, jeopardize the continued existence of the listed species, or destroy or adversely modify critical habitat.

Two additional federal regulations relevant to this Project provide limited species protection. The Migratory Bird Treaty Act (16 USC, Sec. 703, Supp. I, 1989) prohibits killing, possessing, or trading in migratory birds except in accordance with regulations prescribed by the Secretary of the Interior (SFO Master Plan EA 1998). The Bald Eagle Protection Act prohibits persons within the United States (or places subject to U.S. jurisdiction) from "possessing, selling, purchasing, offering to sell, transporting, exporting or importing any bald eagle or any golden eagle, alive or dead, or any part, nest, or egg thereof."

4.10.2 CONCLUSIONS/MITIGATION MEASURES

4.10.2.1 Proposed Action

Implementation of the Proposed Action would involve grading and excavation on the airfield site. The grading would result in the disturbance of existing vegetation communities that occur on the site. However, as shown in the photographs of Figure 1-6, these vegetation communities are comprised of annual grassland/ruderal areas and do not provide habitat for any sensitive species of either flora or fauna. Therefore, there would be no impact to biotic communities, and no mitigation is required.

4.10.2.2 No Action

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on biotic communities.

4.11 ENDANGERED AND THREATENED SPECIES OF FLORA AND FAUNA

4.11.1 METHODS FOR ANALYZING IMPACTS

Field surveys for federally listed endangered or threatened species potentially occurring in the vicinity of the Airport were conducted in conjunction with the SFO Master Plan EA. Literature search and field survey results are listed in the Final EA (1998: 4-190 to 4-199 and 4-200).

Survey and reconnaissance studies indicate that no suitable habitat for special-status species occurs at the project site except possibly for salt marsh harvest mouse. Potential habitat for this species occurs in the tidal marsh along the southeast shore of the airfield adjacent to the project site. Coordination with the USFWS indicated that there are no known records of this species occurring north of the salt marshes near Foster City, approximately 5 miles south of the airport (pers. comm. Don Hankins, USFWS, February 11, 2000). It is unlikely that this species occurs at the project site.

Several factors contribute to the lack of suitable habitat for special status wildlife species on site, including noise, fumes, human activity, and continual disturbance of a working airport. These factors, combined with an aggressive bird-strike avoidance program through alarm calls and raptor models, reduce the value of the area as habitat for all but the most hardy of species, such as Brewer's blackbird (*Euphagus cyanocephalus*), and those with the least requirements for nesting cover, such as killdeer (*Charadrius vociferus*) (SFO Master Plan EA 1998).

4.11.2 CONCLUSIONS/MITIGATION MEASURES

4.11.2.1 Proposed Action

Habitat surveys performed on the airfield have determined the lack of suitable habitat for any rare, threatened, or endangered species within the project area, with the exception of the salt marsh harvest mouse. However, the project site is outside of the known distribution range of this species, and no salt marsh harvest mice are known to occur within the boundaries of SFO. In addition, construction of project facilities would be performed without any disturbance to tidal marsh habitat. Therefore, there would be no effect to rare, threatened, or endangered species, and no mitigation would be required.

4.11.2.2 No Action

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on threatened or endangered species.

4.12 WETLANDS

4.12.1 METHODS FOR ANALYZING IMPACTS

A recent wetland delineation conducted at the proposed PRM facility site (LSA 2000) showed that there is a small area of jurisdictional seasonal wetland (0.05 acre) along the northern edge of the proposed construction area. Also, tidal wetlands occur along the southern edge of the project site. To prevent impact to these areas, the site plan for the project was revised to exclude all construction activities from these areas. Additionally, approved best management practices, including barrier fences will be installed prior to construction to prevent any disturbance to these resources. The project site is also inland from the BCDC jurisdictional boundary and will not impact the tidal wetlands adjacent to the site.

4.12.2 CONCLUSIONS/MITIGATION MEASURES

4.12.2.1 Proposed Action

The site plan for the PRM has been revised to exclude all construction activities outside of the jurisdictional wetlands and the BCDC tidal wetlands adjacent to the project site (Figure 3.12-1).

Best management practices, including barrier perimeter fences will be installed at the project site prior to construction to prevent any impact to these resources. All construction activities will be prohibited beyond the BCDC boundary and within the wetland area. Therefore, there would be no effect on these resources and no mitigation would be required.

4.12.2.2 No Action

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on wetlands.

4.13 FLOODPLAINS

Since facilities included in the Proposed Action would be located outside of Zone A or V of the FEMA Flood Insurance Rate Maps (FIRM), there would be no effect on floodplains and no mitigation measures would be required.

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on floodplains.

4.14 COASTAL ZONE MANAGEMENT PROGRAM AND COASTAL BARRIERS

The California Coastal Commission, through BCDC, regulates development within 100 lineal feet of the high tide mark. In addition, the USACE, NMFS, and EPA regulate any fill activity in San Francisco Bay at or below mean sea level (msl). The new facilities included in the Proposed Action would be located just outside of the coastal zone and above msl. The existing localizer that will be removed as part of the Proposed Action is located within the coastal zone and is under the jurisdiction of BCDC. However, Commission staff have reviewed the proposal to remove the existing localizer, equipment shelter, localizer platform, DME, and security fence and return of the site to its prior condition (i.e., asphalt), and have determined that no Commission action is necessary (see Appendix H). The existing site is a fenced compound adjacent to a San Francisco Community College aeronautical technical school. The localizer and DME sit atop a raised wooden platform, with an equipment shelter located underneath the platform. The entire site is paved. Just outside the fenceline toward the Bay (Seaplane Harbor), are wetlands under the jurisdiction of the USACE. The security fencing, raised platform, and all associated localizer equipment will be removed from the site. All work activity will be confined to the existing site, and no work will occur in the adjacent wetland areas. After all the structures have been removed from the site, the site would be returned to its pre-existing condition (empty paved lot). Therefore, there are no impacts to the coastal zone, and no mitigation measures are required.

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on coastal zones.

4.15 WILD AND SCENIC RIVERS

The Proposed Action would not affect any rivers designated as "wild and scenic" pursuant to the federal Wild and Scenic Rivers Act. The nearest river to the Project site designated as "wild and scenic" is the American River, which is located approximately 80 miles northeast of SFO (SFO Master Plan EA 1998).

4.16 FARMLAND

There are no existing agricultural operations on the SFO property or in the vicinity of the Proposed Action. There would be no impacts to farmlands because no farmland of any type would be converted as a result of the Proposed Action.

4.17 ENERGY SUPPLY AND NATURAL RESOURCES

The Proposed Action would have no effect on energy supply and natural resources and no mitigation measures are required. The Proposed Action would not result in the construction of new facilities that would interfere with the public utility provider's capability to provide adequate power to the site without impacting their overall service.

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on energy supply and natural resources.

4.18 LIGHT EMISSIONS

4.18.1 METHODS FOR ANALYZING IMPACTS

General criteria for findings of significant light emission impacts are defined in FAA Order 1050.1D *Policies and Procedures for Considering Environmental Impacts.*

A site reconnaissance was performed to evaluate the existing night lighting conditions within the Project viewshed (area from which Project features would potentially be visible), and to evaluate potential effects of Project-related light emissions from sensitive receptor locations identified in the field. Generally, highly conspicuous light emissions, or light emissions causing obtrusive amounts of glare to sensitive receptors, would be considered potentially significant.

4.18.2 ISSUES

Light emissions that could create an annoyance for people in the vicinity of an installation are considered a potential impact of airport development.

4.18.3 CONCLUSIONS/MITIGATION MEASURES

4.18.3.1 Proposed Action

In general all structures and appurtenances located near the Airport runways require night safety lighting. In particular, structures intruding upon the navigable airspace or exceeding obstruction standards defined in FAA FAR Part 77 require obstruction marking and lighting, as defined in FAA Advisory Circular 70/7460-1J (DOT 1996). Those requirements would apply to the structures under the Proposed Action. This required obstruction lighting would include omnidirectional flashing and/or non-flashing aviation red obstruction beacons during the nighttime hours, and medium or high intensity flashing white obstruction lights to be used during daytime and twilight conditions. These would be mounted at the highest point of the structures, and at intermediate heights as further described in the guidelines. In addition, the guidelines specify that the proposed structures shall be painted in alternating bands of aviation orange and aviation white paint. The objective of these requirements is to maximize visibility of the structures, for safety reasons.

No other significant lighting associated with the Proposed Action, which would be visible from public viewpoints, is proposed.

Sensitive viewpoints from which the Project lighting would be visible include portions of the adjacent Airport frontage road, Millbrae Park, and nearby hotels and other businesses. Within the Airport, passengers in the waiting areas of Gates 21, 27, and 28 would have unobstructed views of the PRM through east- and south-facing windows.

The proposed lighting is designed to be highly visible for reasons of aircraft navigation safety, and thus would be visible at a distance, including the identified sensitive viewing locations. However, these new lights would be seen in the context of the existing Airport, which is characterized by extensive existing night lighting, including brightly lit runway-related facilities, as well as the main Airport terminals and aprons. In this context, the lighting of the main terminals and aircraft aprons is by far the most visible source of night lighting in the area, overwhelming the light from individual structures such as those under the Proposed Action. Safety beacons associated with the proposed structures would be seen from the potentially sensitive viewpoints identified above at distances that would render their brightness unobtrusive and relatively inconspicuous. At these distances they would not pose a hazard or annoyance to automobile drivers on adjacent public roadways. In general, from potential off-site viewpoints they would be perceived as a small number of additional distant beacons among many currently visible in this viewshed, and this addition would be unlikely to be noticed by the general public. Similarly, for passengers in waiting areas of the terminal, it is unlikely that the Project-related beacons would be perceived at all, due to the overwhelming brightness of adjacent terminal/apron lighting.

No adverse impact is anticipated as a result of Proposed Action-related night light emissions, and no mitigation measures are required.

4.18.3.2 No Action

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on light emissions.

4.19 ELECTRONIC EMISSIONS

4.19.1 METHODS FOR ANALYZING IMPACTS

The IEEE and ANSI standard for nonionizing radiation (IEEE, 1992) provides the national standard for exposure limits to nonionizing radiation. This standard gives recommendations to prevent harmful effects in human beings exposed to electromagnetic fields in the frequency range from 3 kHz to 300 GHz. These recommendations apply to exposures in controlled and uncontrolled environments. Uncontrolled environments are generally those where individuals, particularly children with their lesser body weight, have uncontrolled access. The recommended exposure levels vary depending on the frequency of the source. The standards for fuel handling are taken from Air Force Technical Manual TO 31Z-10-4, *Electromagnetic Radiation Hazards* (USAF 1989).

This technical manual includes detailed methods for calculating the distance from nonionizing radiation sources where potentially hazardous exposure levels exist, given the frequency, power, gain, maximum exposure level, and operational methods. The most conservative calculation of hazard distances involves the "far-field" method that was utilized in this assessment.

4.19.2 ISSUES

An impact would be considered significant if normal operating procedures could not preclude hazards to people through direct exposure to RF radiation or ignition of fuel vapors during fuel handling operations.

4.19.3 CONCLUSIONS/MITIGATION MEASURES

4.19.3.1 Proposed Action

The Proposed Action would involve the installation and operation of three sources of nonionizing radiation: the PRM, the glide slope, and the localizer/DME. Salient characteristics of these sources are included in Table 4.19-1.

Table 4.19-1

Characteristics of Nonionizing Radiation Sources

RF Source	Frequency (MHz)	Peak Power (W)	Average Power (W)	Antenna Gain (dBi)	Low Beam Angle from Horizontal (degrees)	Height above ground (m)
Precision Runway Monitor	1030	75	0.081	21	-2	23.5
Glide Slope	330	3	3	10	+3	2
Localizer/DME	111	15	15	26	+11	2

Source: Parsons 1999

Notes: MHz – megahertz; W – watts; dBi – power gain in decibels; m – meters

MPE levels under the IEEE standards vary depending on frequency. For fuel handling, the peak power density should not exceed 5 W/cm^2 at the locations where fueling operations occur. Based on the emitter characteristics included in Table 4.18-1, the MPEs for the three emitters are included in Table 4.19-2. The table also includes the hazard distance along the main beam in front of the emitters where the MPEs or the fuel handling power density levels are exceeded. The MPEs assume a controlled environment where unauthorized personnel, particularly children, are not allowed.

Table 4.19-2

Hazard Distances for Nonionizing Radiation Sources

RF Source	MPE (MW/CM^2)	MPE Hazard Distance (m)	FUEL HAZARD LEVEL (W/CM^2)	Fuel Hazard Distance (m)
Precision Runway Monitor	3.43	0.05	5	3.88
Glide Slope	1.10	0.15	5	0.22
Localizer/DME	1.00	2.18	5	3.08

Source: Parsons 1999

Notes: mW/cm^2 – milliwatts per square centimeter; m – meters; W/cm^2 – watts per square centimeter

For the PRM and the glide slope, the MPE hazard distances along the main beam are negligible. For the Localizer/DME, the MPE hazard distance extends approximately two meters along the main beam. The main beam is angled upwards at an angle of 11 degrees with an assumed two-meter height for the origination of the beam. Personnel within that distance in front of the Localizer/DME would be performing maintenance in compliance with Airport health and safety procedures, including signs warning of the potential hazard. The averaging time for these exposure levels is six minutes. Given this averaging time, the height above ground level, and the presence of warning signs, it is unlikely that grounds maintenance personnel would be exposed to hazardous levels.

The PRM has the greatest fuel handling hazard distance at approximately four meters along the main beam. However, at its height of 23.5 meters above ground level, there would be no conceivable interaction with fuel handling operations. The Localizer/DME has a fuel hazard distance of approximately three meters and the beam angle is directed upwards at 11 degrees. No fuel handling operations occur within three meters in front of the Localizer/DME, and there would be no hazards. The hazard distance for the glide slope is negligible and would not create a hazard.

No adverse impact is anticipated as a result of Proposed Action-related electric emissions, and no mitigation measures are required.

The hazard distances for the three RF emitters are sufficiently small that there would be no cumulative effects in combination with other RF emitters at the Airport.

4.19.3.2 No Action

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on RF emissions.

4.20 SOLID WASTE

The Proposed Action would not generate new wastes and would therefore have no effect on solid waste disposal.

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on solid waste disposal facilities.

4.21 CONSTRUCTION

While the Proposed Action would not result in any significant physical effects associated with construction activities, the need exists for the contractor to coordinate construction activities with SFO staff due to the proximity of the construction activities and airfield operations. In order to ensure there are no impacts associated with contractor safety, the selected contractors will be required to prepare site specific health and safety plans and hazard communications plans so that contractor staff are provided with information necessary to deal with potential airfield hazards. Implementation of this mitigation measure would reduce the potential impact to a less than significant level.

As part of the SFO Master Plan Final Environmental Impact Report (FEIR) (City and County of San Francisco, 1998), SFO has committed to a set of construction-related measures to mitigate potentially significant Project impacts. These measures are described in detail in Section 4.20

Construction, of the SFO Master Plan EA (1998) and are further discussed in the Noise, Transportation, Air Quality, Water Quality, and Hazardous Materials sections of this EA. For example, any construction debris generated would be disposed of at an appropriate off-site facility in accordance with applicable federal, state, and local regulations.

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have a construction related impact.

4.22 VISUAL

4.22.1 METHODS FOR ANALYZING IMPACTS

This analysis was based on a December 3rd, 1999 site reconnaissance review of the Proposed Action facilities and existing adjacent development and land uses. Potentially sensitive public viewpoints within the area of potential Project visibility were identified in the field. The potential visual character, contrast and conspicuousness of the proposed features were evaluated from potentially sensitive public viewpoints, as were their potential to obstruct scenic views or to produce glare. The evaluation of potential Project contrast and conspicuousness was supported by photosimulations from the identified key observer positions. The photosimulation viewpoint locations are shown on Figure 4.20-1. All other locations (also shown on Figure 4.20-1) are presumed to have a similar view although seen from a greater distance.

In general, visual impacts could occur if the proposed facilities intruded prominently into scenic views or view corridors as seen from sensitive public viewpoints. That is, proposed features would have an adverse visual impact if:

- they were highly prominent or contrastive, with the potential to degrade or significantly change the character of a viewshed possessing high visual quality;
- they substantially block viewers' access to a visual resource of high visual quality;
- they have these adverse effects as seen from public viewpoints of high viewer sensitivity to visual change; and
- they cause intrusive or hazardous glare.

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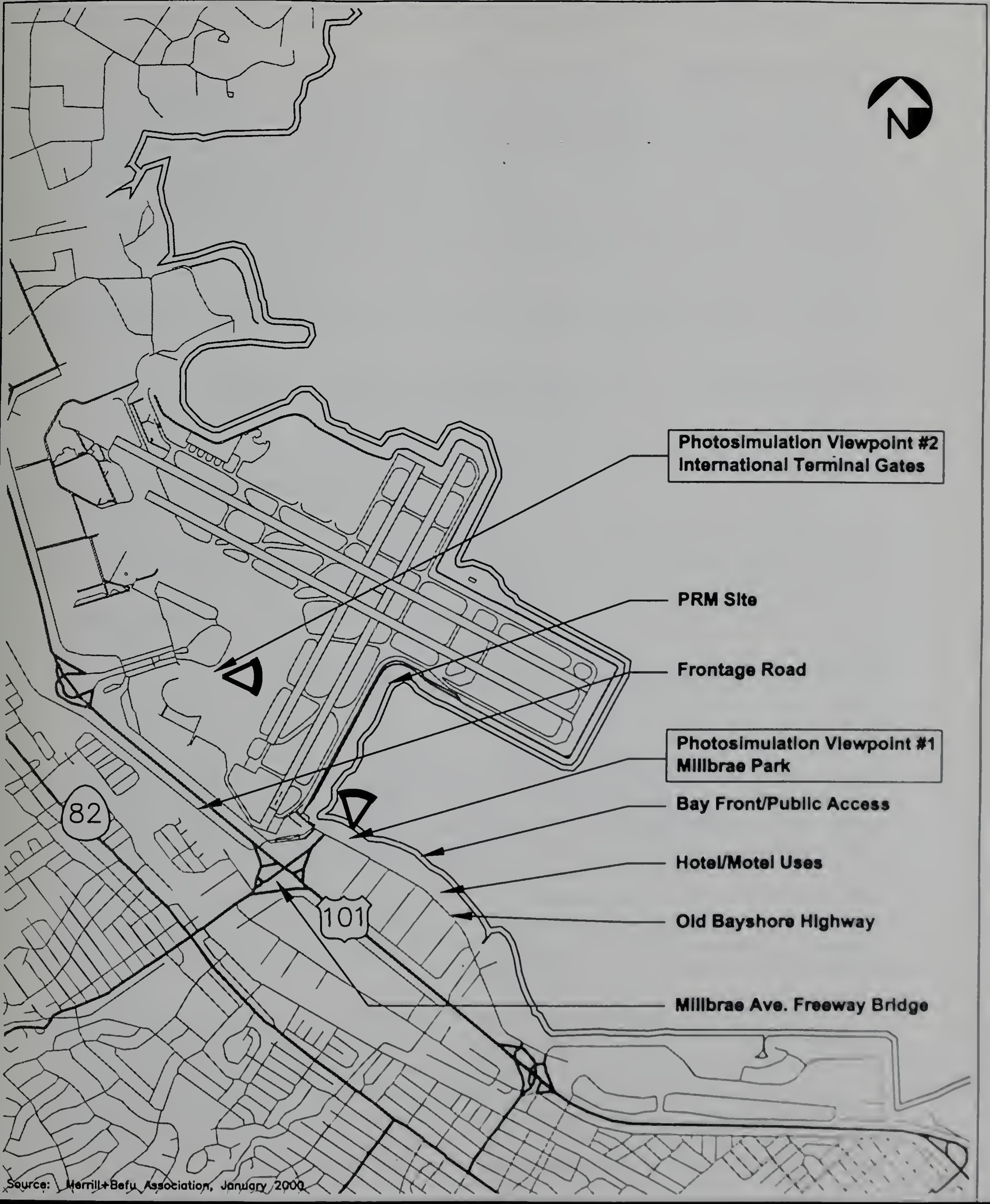

N
Photosimulation Viewpoint #2
International Terminal Gates
PRM Site
Frontage Road
Photosimulation Viewpoint #1
Millbrae Park
Bay Front/Public Access
Hotel/Motel Uses
Old Bayshore Highway
Millbrae Ave. Freeway Bridge
82
101

Source: Merrill+Befu Association, January 2000

Public Viewpoint Locations

PARSONS
HARLAND BARTHOLOMEW
& ASSOCIATES, INC.

Figure 4.22-1

4.22.2 ISSUES

The proposed features would be visible from within the Airport itself; from sensitive nearby public land uses such as Millbrae Park, adjacent roadways, etc.; and from traveling aircraft on or approaching the adjacent runways. Because the proposed features would be visible from sensitive public viewpoints within a viewshed of high visual interest and quality, an evaluation was conducted to determine the potential extent of adverse Project effects on scenic views from those locations. In addition, inadvertent reflective glare which could pose a navigational hazard to drivers or pilots, as well as an annoyance to the general public was also evaluated.

The visual impacts at night, including potential direct glare from night lighting, are described in the section 4.17 Light Emissions.

Several factors contribute to the analysis of Proposed Action visual impact:

- Site configuration and *visual exposure* of potential viewers
- Site context: existing landscape *character*, scenic *quality*, and scenic views
- *Sensitivity* of viewers to potential visual change: viewer sensitivity is determined by their scenic expectations, which are in turn determined to a large degree by the type of activity they are engaged in when exposed to Project views
- *Visual prominence* or conspicuousness of Project features as determined by scale, mass, materials and height of the Project
- Distance from the viewer, which determines apparent visual scale or *visual magnitude*

4.22.3 CONCLUSIONS/MITIGATION MEASURES

4.22.3.1 Proposed Action

The proposed PRM tower height would not exceed 81.5 feet AGL inclusive of supporting structure, antenna, and lightening protection. The distance to the tower feature from areas of public view are substantial (3,200 feet or greater). These distances, combined with the vast, open viewshed within which the tower would be seen, would render the improvements nearly unnoticed by casual public viewers. In addition, the visual character of the proposed improvements is similar to and consistent with the existing visual elements of the Airport, which are also of an industrial, utilitarian character. Therefore, the impact on the existing visual resource is considered to be less than significant. No mitigation is recommended. Individual sensitive viewing locations are discussed below.

The Localizer/DME structures are small in scale, comprising an 8 element array approximately five feet in height. As such it would be visually inconspicuous from all sensitive veiwpoints. Similarly, the proposed glide slope would comprise an 8’ by 14’ equipment shelter, which would be visually inconspicuous from all sensitive viewpoints; and a 50’ tall antenna with a 2 – 3 foot-per-side base, which, due to its narrow profile, moderate height and similarity in character to other runway structures, would be visually inconspicuous. For these reasons neither the Localizer/DME nor glide slope are anticipated to have any visual impacts.

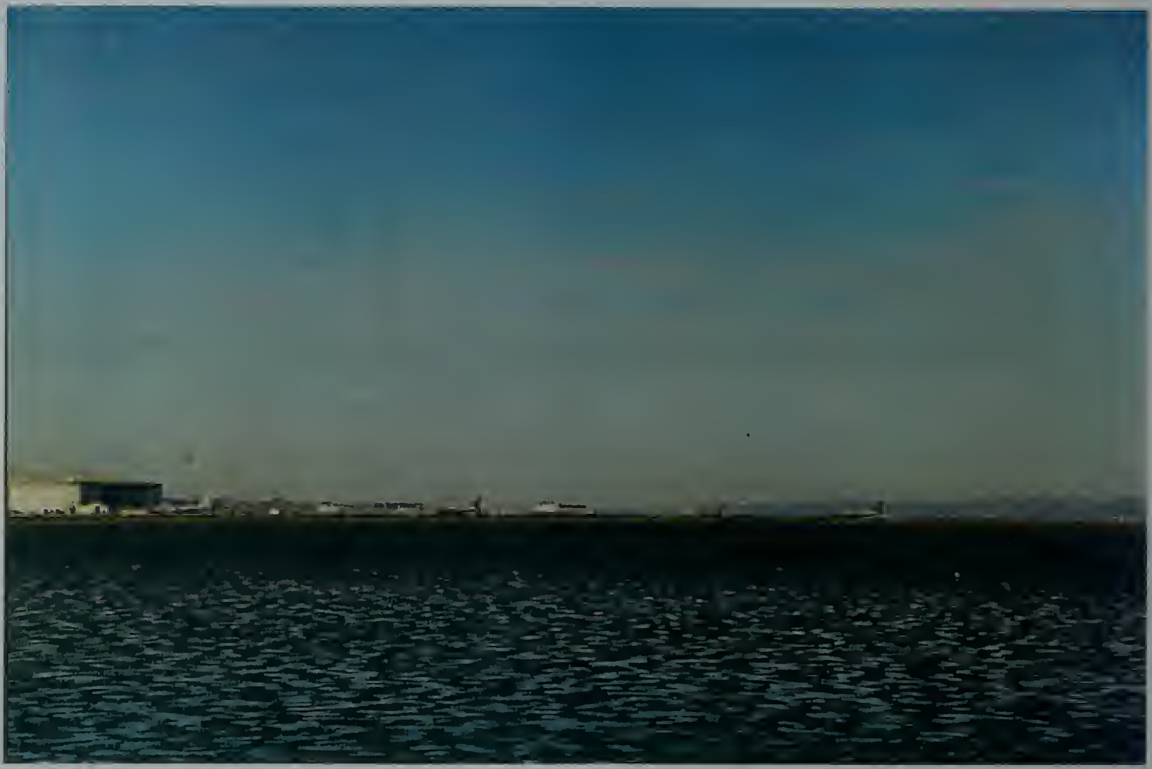
Millbrae Park

Millbrae Park, located along the Bay shoreline, is a potentially sensitive viewing location by virtue of its scenic existing views to SFO and the Bay, its visual exposure to the proposed features, and the scenic orientation of park visitors, who are generally engaged in viewing the landscape and would thus be sensitive to adverse visual changes.

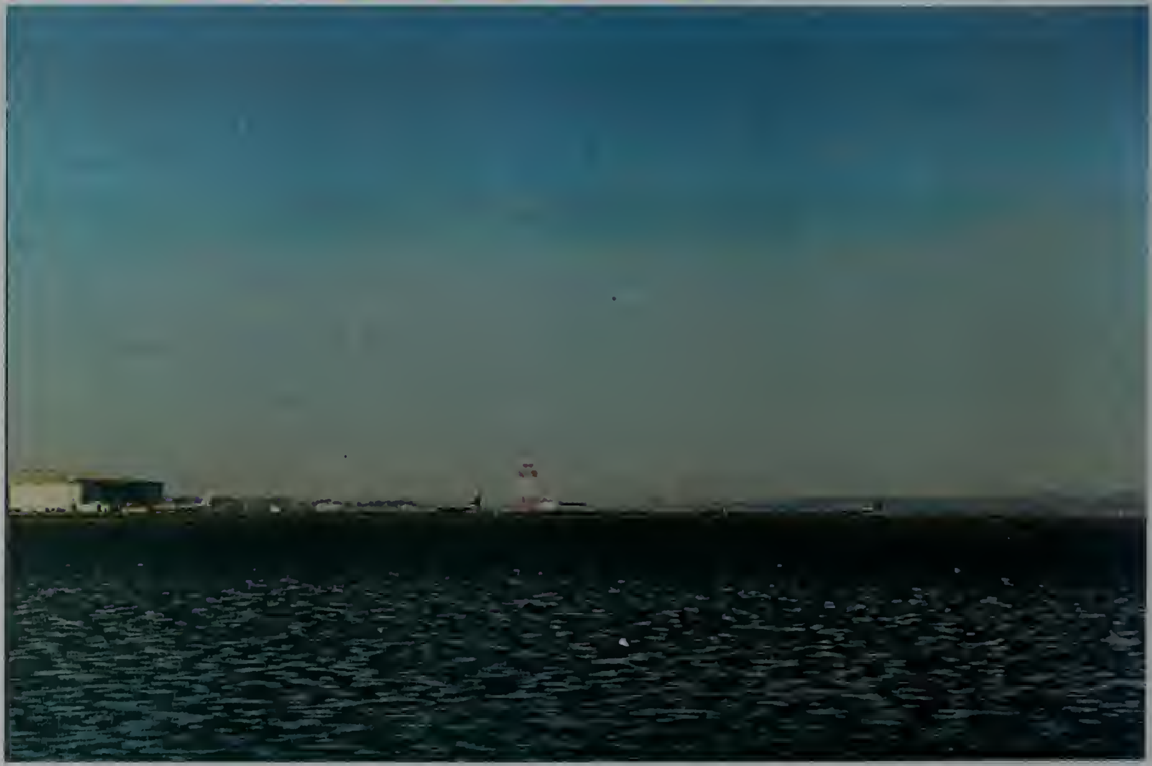
From this viewpoint, which is located at a distance of roughly 4,200 feet from the proposed PRM site, the PRM would be clearly visible, but would have low visual contrast and prominence due its very small apparent scale within the overall visual field (Figure 4.20-2). Its utilitarian character would be in keeping with the existing character of other such features in the view, including existing towers, hangars, lights, and fencing. The tower would not obstruct views to SFO or the San Francisco Bay, and would have a negligible effect on the character and quality of those views. Due to viewing distances and the size and mass of the Localizer/DME and glide slope, these structures would not be evident to the casual viewer from this viewing location. Impacts would be less than significant.

SFO Passenger Terminal

Views to the proposed PRM would occur from windows at Gates 21, 27, and 28 during daytime hours, at a distance of roughly 3,300 feet. No other public Terminal viewpoints to the proposed features were identified. Viewers in these locations would be expected to have moderate to low sensitivity to visual change, since the available views from the Gate waiting areas are not highly scenic, and their most scenic feature is the activity of aircraft taking off and landing, rather than the landscape *per se*. At this distance the PRM would be clearly visible, but would have low visual contrast and prominence due its very small apparent scale within the overall visual field (Figure 4.20-3). Its utilitarian character would be in keeping with the existing character of other such features in the view, including existing towers, hangars, lights, and fencing. The tower would not obstruct views to SFO or the San Francisco Bay, and would have a negligible effect on the character and quality of those views. Due to viewing distances and the size and mass of the Localizer/DME and glide slope structures, these structures would not be evident to the casual viewer at this viewing location. Impacts would be less than significant.



Viewpoint #1 from Milbrae Park - No Action



Viewpoint #1 from Milbrae Park - Proposed Action

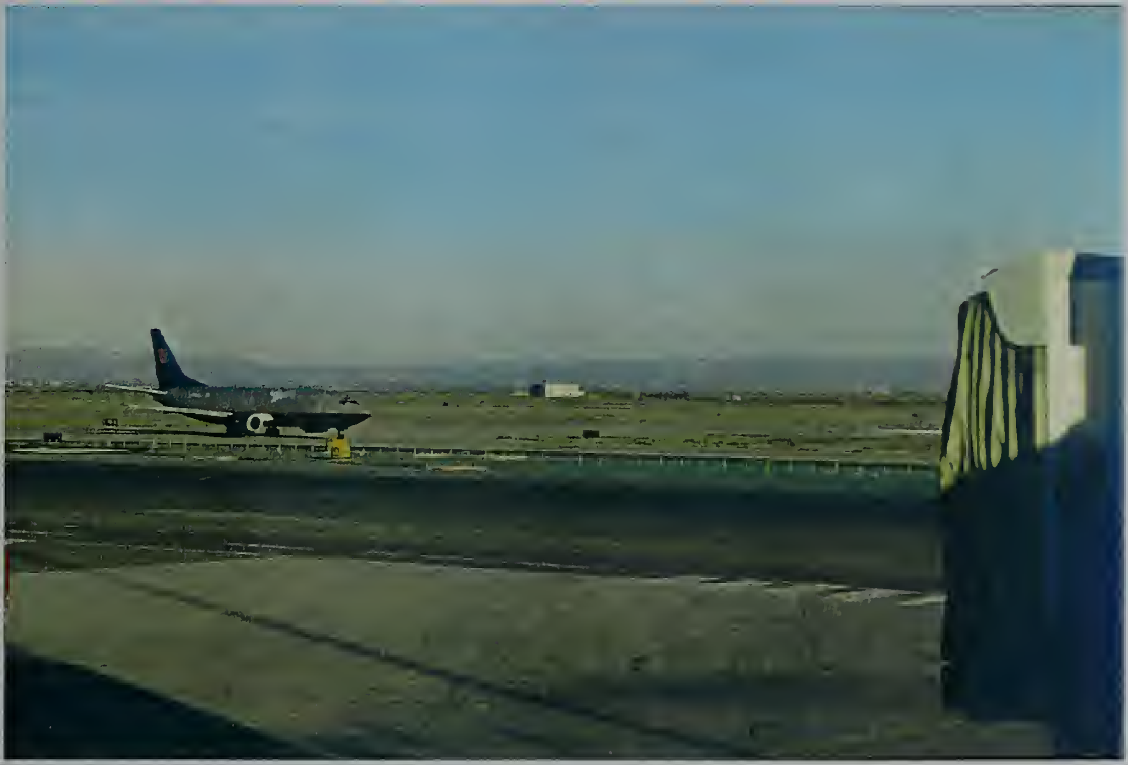
Source William Kanemoto and Associates

SFO
SOIA/PRM EA

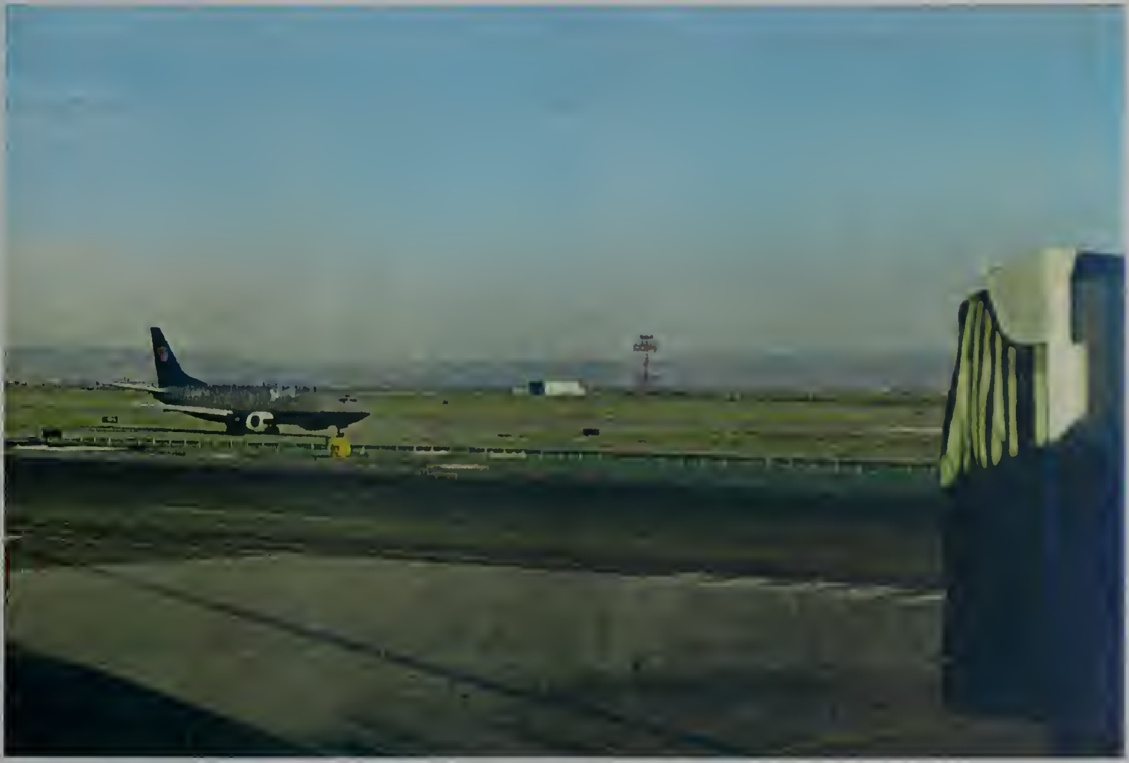
Photosimulation

PARSONS
HARLAND BARTHOLOMEW
& ASSOCIATES, INC.

Figure 4.22-2



Viewpoint #2 from International Terminal Gates - No Action



Viewpoint #2 from International Terminal Gates - Proposed Action

Source William Kanemoto and Associates

Photosimulation

Passengers in Planes on Runway

Views of the Proposed Action facilities by passengers in planes on the runway are restricted and fleeting. The scenic expectations of passengers on the runway are also such that utilitarian structures such as the proposed features would not be viewed as an adverse impact, but rather, consistent with the existing runway setting. No impact would be anticipated.

Glare to Pilots

FAA Advisory Circular AC 70/7460-1J (DOT 1996) describes the very strict guidelines by which the Proposed Action structures would be painted and lit. These guidelines ensure that inadvertent direct or reflective glare that would pose a hazard to pilots would not occur. No impact would be anticipated.

Nearby Hotels

Nearby hotels are located as close as 4,500 feet from the proposed PRM site. From these vantage points the view and impact would be very similar to those from Millbrae Park. Viewer sensitivity would be lower than at the park. The Localizer/DME and glide slope structures would not be evident to the casual viewer at this viewing location. As discussed above, at these distances the Proposed Action features would have low prominence due to their small scale within the overall visual field and would not have adverse impacts on these views.

Boat/Bay Viewpoints

Within allowable distances on the Bay, the proposed features would be virtually unnoticed against the much larger Terminals and other prominent Airport features.

Highway and Approach Ramps

From Highway 101 and elevated Airport approach ramps, the PRM tower would appear distant, fleetingly, and would be virtually unnoticed. The Localizer/DME and glide slope structures would not be evident to the casual viewer at these viewing locations. No impacts are anticipated.

Frontage Road

Intermittent views from the adjacent frontage road south of SFO would be similar to views from Millbrae Park, but would be more fleeting and transitory. Automobile passengers are less sensitive to visual impacts than park viewers, since their activity is less focused on the landscape than is that of park visitors. No impact would be anticipated. Per FAA Advisory Circular AC 70/7460-1J, the proposed structures would be completely painted (DOT 1996). As a result, no unwanted glare from reflective metal surfaces that could affect automobile navigation would be anticipated.

4.22.3.2 No Action

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would not have an impact on visual resources.

4.23 HAZARDOUS MATERIALS

Based upon the results of the Site Assessment prepared for the PRM site (LEE/BC, 1999), the Proposed Action would not result in the disturbance of hazardous materials during excavation activities. Implementation of this mitigation measure would reduce the potential impacts from existing hazards to a less than significant level.

No Site Assessment was performed for the Localizer/DME or glide slope locations. However, a Geotechnical Investigation was performed and soil borings were analyzed for soil type. During this analysis, no unusual concerns were identified. Both facilities will require minimal grading, and therefore little possibility of encountering unknown hazards. Based upon the location of the facilities, this potential impact is considered to be less than significant.

Implementation of the No Action alternative would result in no changes from existing conditions. No adverse impacts would result and no mitigation measures are required. This alternative would have no impact from hazardous materials.

4.24 CUMULATIVE IMPACTS

No cumulative impacts have been identified.

The Proposed Action involves construction of three ground-based facilities on the southeastern end of the SFO airfield. The only concurrent project within the vicinity of these ground-based facilities is the Airport's fiber optic cabling project. The Proposed Action will benefit from the fiber optic project, as trenching lengths will be reduced based upon the proximity of newly placed utilities.

The Airspace changes that would occur as a result of the proposed SOIA procedure and feeder route modifications would not result in any project-related impacts. One other airspace project has recently been approved for feeder routes that serve the Oakland Airport. However, like the modifications to SFO feeder routes, the Oakland feeder route modifications will not result in any significant noise or land use impacts.

CHAPTER 5

PREPARERS

LEAD AGENCY CONTACTS

Charlie Lieber	FAA Western-Pacific Region, Air Traffic Division
Keith Lusk	FAA Western-Pacific Region, ANI-930
Jeff Coron	FAA Program Office, AND-402
Dale Blount	SFO Planning and Environmental Affairs

PERSONS CONTACTED

Don Hankins, United States Fish & Wildlife Service
Mark Littlefield, United States Fish & Wildlife Service
David Marshall, Bay Area Air Quality Management District
Steve Moore, San Francisco Bay Area Regional Water Quality Control Board
Carl Wilcox, California Department of Fish & Game
Daniel Abeyta, California Office of Historic Preservation
Leslie Lacko, San Francisco Bay Conservation and Development Commission
Dale Blount, SFO Planning
Renee Dixon, SFO Planning
Jim Chiu, SFO Engineering
Keith Lusk, FAA
Charlie Lieber, FAA
Jeff Coron, FAA
Annette Gowans, FAA
Andy Richards, Bay TRACON
Harvey Hartmann, Bay TRACON
Rob Schonholtz, LSA Associates, Inc.

LIST OF PREPARERS

Parsons Harland Bartholomew & Associates, Inc. (Prime Contractor)

Staff Member	Responsibility
Pat Collins	Project Manager
Rob Brueck	Deputy Project Manager
Anders J. Hauge	Document Review/Quality Assurance
Kelly Heidecker	Environmental Analyst, Archaeological Resources
John Miller	Environmental Analyst
Ed West	Environmental Analyst, Biological Resources
Phil Boyle	Land Use

Subcontractors

Subcontractors	Staff	Responsibility
ATAC Corporation	Don Crisp	Noise
	Jeff Olmstead	Noise Modeling
	Cristopher Robinson	Noise Modeling/Report Writing
The Ellington Group	Calvin J. Womble	Air Quality
	Robbi Kiel	Air Quality Technical Analysis
Pittman & Hames	Donna Pittman	Transportation and Social Issues
Merrill + Befu	Cathy Merrill	Visual Resources
	Bill Kanemoto (Sub)	Visual Resources, Photosimulations and Light Emissions

APPENDIX A

REFERENCES

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APPENDIX B
GLOSSARY

ABAG	Association of Bay Area Governments
ADT	Average Daily Traffic
AGL	Above Ground Level
ALP	Airport Layout Plan
ANSI	American National Standards Institute
ASR	Airport Surveillance Radar
ASDE	Airport Surface Detection Equipment
ATC(T)	Air Traffic Control (Tower)
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
Bay TRACON	Bay Terminal Radar Approach Control
BCDC	Bay Conservation District Commission
BMP	Best Management Practices
BSR	Big Sur
CAAQS	California Ambient Air Quality Standards
Caltrans	California Department of Transportation
CAP	Clean Air Plan
CARB	California Air Resources Board
CASP	California Aviation System Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Levels
CO	Carbon Monoxide
dB	Decibals
dBi	Power gain in decibels
DNL	Day-Night Level
DOT	Department of Transportation
EA	Environmental Assessment

EED	Electroexplosive Device
E/G	Emergency Generator
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FEIR	Final Environmental Impact Report
FONSI	Finding of No Significant Impact
HC	Hydrocarbons
IEEE	Institute of Electrical and Electronics Engineers
IFR	Instrument Flight Rules
ILS	Instrument Landing System
INM	Integrated Noise Model
Localizer/DME	Localizer-type Directional Aid with Distance Measuring Equipment
MHz	Megahertz
MOD	Modesto
MPE	Maximum Permissible Exposure
MSL	Mean Sea Level
MTC	Metropolitan Transportation Commission
mW/cm^2	milliwatts per square centimeter
NAAQS	National Ambient Air Quality Standards
NAS	National Airspace System
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NO_2	Nitrogen Oxide
NO_x	Nitrogen Oxides
NOAA	National Oceanic and Atmospheric Administration
NTB	National Transportation Board
O_3	Ozone
OPS	Operations Site
PRM	Precision Runway Monitor
PYE	Point Reyes

RF(D)	Radio Frequency (Distribution Unit)
SFO	San Francisco International Airport
SO_2	Sulphur Dioxide
SOIA	Simultaneous Offset Instrument Approach
STAR	Standard Terminal Arrival
Stratus	A low-altitude cloud formation consisting of a horizontal layer of gray clouds
T&E	Threatened and Endangered Species
TAF	Terminal Area Forecast
T/R	Transmitter/Receiver
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VOR/DME	A navigation aid providing azimuth and distance measuring equipment at one site
VORTAC	See VOR/DME
VFR	Visual Flight Rules
W	Watts
W/cm^2	Watts per square centimeter

APPENDIX C
REVIEWERS (EA DISTRIBUTION LIST)

Agency	Contact	Address
Caltrans	Dan Gargas	Aeronautics Program P.O. Box 942874, MS #40 Sacramento, CA 94274
US Fish and Wildlife	Mark Littlefield	Sacramento Field Office 3310 El Camino, Suite 130 Sacramento, CA 95821-6340
US Environmental Protection Agency	David Tomsovic Mike Monroe Tom Yocum	Region IX 75 Hawthorne Street San Francisco, CA 94105-3901
Regional Water Quality Control Board	Steve Moore	1515 Clay Street, Suite 1400 Oakland, CA 94612
San Francisco Bay Conservation and Development Commission	Linda Scourtis, Don Neuwirth, Leslie Lacko	30 Van Ness Avenue, Suite 2011 San Francisco, CA 94102
National Oceanic & Atmospheric Administration	Mark Helvey Laura Hamilton	National Marine Fisheries Service 777 Sonoma Avenue Santa Rosa, CA 95404
US Army Corps of Engineers	Bob Smith Ed Wylie	333 Market Street San Francisco, CA 94105-2197
US Coast Guard, Maintenance & Logistics Command Pacific	Captain Robert Lachowsky Carol Meyer	Coast Guard Island, Building 54-D Alameda, CA 94501-5100
State Lands Commission	Dave Plummer Mary Griggs	100 Howe Avenue, Suite 100 South Sacramento, CA 95825-8202
CA Dept. of Fish and Game	Carl Wilcox	P.O. Box 47 Yountville, CA 94599
CA Office of Historic Preservation, Dept. of Parks & Recreation	Daniel Abeyta	P.O. Box 942896 Sacramento, CA 94296-0001
Association of Bay Area Governments	Susan Ryder	Metro Center 101 Eighth Street Oakland, CA 94607
Bay Area Air Quality Management District	L. Mussen	939 Ellis Street San Francisco, CA 94109

Agency	Contact	Address
Airport/Community Roundtable (50 copies)	Mary Griffin	Administration Office 1828 El Camino Real, Suite 705 Burlingame, CA 94010
Advisory Council on Historic Preservation	Lee Keatinge	12136 West Bayaud Avenue, Suite 330 Lakewood, Colorado 80228
CA Air Resources Board	Bob Fletcher, Mike Tollstrup, Gary Honcoop	2020 "L" Street Sacramento, CA 95814
U.S. House of Representatives District 8	Congresswoman Nancy Pelosi	450 Golden Gate Ave., 14th Floor San Francisco, CA 94102
U.S. House of Representatives District 12	Congressman Tom Lantos	400 South El Camino Real, Suite 410 San Mateo, CA 94402
U.S. House of Representatives District 13	Congressman Pete Stark	39300 Civic Center Drive, Suite 220 Fremont, CA 94538
U.S. House of Representatives District 14	Congresswoman Anna Eshoo	698 Emerson Street Palo Alto, California 94301
U.S. House of Representatives District 15	Congressman Tom Campbell	910 Campisi Way, Suite 1C Campbell, CA 95008
U.S. House of Representatives District 16	Congresswoman Zoe Lofgren	635 N. First Street, Suite B San Jose, CA 95112
U.S. Senate	Senator Dianne Feinstein	331 Hart Senate Office Building Washington, D.C. 20510
U.S. Senate	Senator Barbara Boxer	112 Hart Senate Office Building Washington, D.C. 20510
California State Assembly District 12	Assemblyman Kevin Shelley	455 Golden Gate Avenue, Suite #14600 San Francisco, California 94102
California State Assembly District 13	Assemblywoman Carole Migden	455 Golden Gate Avenue, Suite 14300 San Francisco, CA 94102
California State Assembly District 16	Assemblywoman Audie Elizabeth Bock	1515 Clay Street , Suite 2204 Oakland, CA 94612
California State Assembly District 19	Assemblyman Louis J. Papan	660 El Camino Real , Suite 214 Millbrae, CA 94030
California State Assembly District 20	Assemblyman John Dutra	39510 Paseo Padre Parkway, Suite 360 Fremont, CA 94538

Agency	Contact	Address
California State Assembly District 21	Assemblyman Ted Lempert	4149 El Camino Way Suite B Palo Alto, CA 94306-4010
California State Assembly District 22	Assemblywoman Elaine Alquist	275 Saratoga Avenu , Suite 205 Santa Clara, CA 95050
California State Assembly District 23	Assemblyman Mike Honda	100 Paseo De San Antonio, Suite 300 San Jose, CA 95113
California State Assembly District 24	Assemblyman Jim Cunneen	901 Campisi Way, Suite 300 Campbell, CA 95008
California State Senate District 7	Senator Richard Rainey	1948 Mt. Diablo Blvd. Walnut Creek, CA 94596
California State Senate District 8	Senator Jackie Speier	400 South El Camino, Suite #630 San Mateo, CA 94402
California State Senate District 9	Senator Don Perata	1515 Clay Street, #2202 Oakland, CA 94612
California State Senate District 10	Senator Liz Figueroa	43271 Mission Blvd. Fremont, CA 94539
California State Senate District 11	Senator Byron Sher	260 Main Street, Ste. 201 Redwood City, CA 94063
California State Senate District 13	Senator John Vasconcellos	100 Paseo de San Antonio, Suite 209 San Jose, CA 95113
Alameda County Community Development Agency	Adolph Martinelli, Director	399 Elmhurst Street Hayward, CA 94544
Alameda Planning Department	Colette Meunier, Director	2250 Central Avenue, Room 160 Alameda, CA 94501
Albany Department of Community Development and Environmental Resources	Gary Patton, Planning Manager	1000 San Pablo Avenue Albany, CA 94706
Fremont Department of Development and Environmental Services, Planning Division	Dan Marks, City Planner	39550 Liberty Street, PO Box 5006 Fremont, CA 94537
Hayward Department of Community and Economic Development	Sylvia Ehrenthal, Director	777 B Street Hayward, CA 94541
Newark Community Development Department	Jim Reese, Director	37101 Newark Blvd. Newark, CA 94560
Oakland Economic Development Agency, Strategic Planning	William Claggett, Agency Director	250 Frank Ogawa Plaza #3330 Oakland, CA 94612

Agency	Contact	Address
Piedmont Department of Public Works	Lori Salamack, City Planner	120 Vista Avenue Piedmont, CA 94611
San Leandro Planning Department	Steve Emslie, Director	835 East 14th Street San Leandro, CA 94577
Union City Community Development Department	Mark Leonard, Director	34009 Alvarado-Niles Road Union City, CA 94587
San Mateo County Environmental Services Agency, Planning and Building Division	Terry Burnes, Planning Administrator	590 Hamilton Street, 2nd Floor Redwood City, CA 94063
Atherton Planning Commission	Neal Martin, City Planner	91 Ashfield Avenue Atherton, CA 94027
Belmont Planning and Community Development Department	Daniel Vanderpriem, Director	1070 Sixth Avenue, Suite 302 Belmont, CA 94002-3893
Brisbane Building/Planning Department	Carole Nelson, Director	50 Park Lane Brisbane, CA 94005
Burlingame Planning Department	Margaret Monroe, City Planner	501 Primrose Road Burlingame, CA 94010
Colma Planning Department	Malcolm Carpenter, City Planner	1190 El Camino Real Colma, CA 94014
Daly City Department of Economic and Community Development	Terry Sedik, Director	333 90th Street Daly City, CA 94014
East Palo Alto Community Development Department, Planning Division	Michael Bethke, Director	2200 University Avenue East Palo Alto, CA 94303
Foster City Community Development Department	Richard Marks, Director	610 Foster City Blvd. Foster City, CA 94404
Hillsborough Planning Department	Maureen Morton, Town Planner	1600 Floribunda Avenue Hillsborough, CA 94010
Menlo Park Development and Planning Division	Arlinda Heineck, Chief Planner	701 Laurel Street Menlo park, CA 94025
Millbrae Community Development Department	Ralph Petty, Director	621 Magnolia Avenue Millbrae, CA 94030
Portola Valley Planning Commission	George Mader, Town Planner	765 Portola Road Portola Valley, CA 94028
Redwood City Planning and Redevelopment Agency	Michael Church, Manager	1017 Middlefield Road Redwood City, CA 94063

Agency	Contact	Address
San Bruno Planning and Building Department	George Foscardo, Director	567 El Camino Real San Bruno, CA 94066
San Carlos Planning Department	Neal Martin, Director	600 Elm Street San Carlos, CA 94070
Sunnyvale Department of Community Development	Trudi Ryan, Planning Officer	P.O. Box 3707 Sunnyvale, CA 94088-3707
City of San Mateo	Gaye Quinn, Chief of Planning	330 West 20th San Mateo, CA 94403
South San Francisco Planning Division	Jim Harnish, Chief Planner	PO Box 711 South San Francisco, CA 94083
Woodside Department of Planning and Building	Michael Foley, Director	PO Box 620005 Woodside, CA 94062
Santa Clara County Department of Planning and Development	Michael Lopez, Office Manager	70 West Hedding Street, 7th Floor, East Wing San Jose, CA 95110
Campbell Community Development Department	Steve Piasecki, Director	70 North First Street Campbell, CA 95008-1423
Cupertino Community Development	Robert Cowan, Director	10300 Torre Avenue Cupertino, CA 95014
Los Altos Planning Department	Larry Tong, Director	One North San Antonio Road Los Altos, CA 94022
Los Altos Hills Planning Department	Curtis Williams, Director	26397 Fremont Road Los Altos Hills, CA 94022
Los Gatos Comm. Development Department	Marilyn Cosden	110 E. Main Street Los Gatos, CA 95031
Milpitas Community Development Department, Planning Division	Valerie Barone, Principle Planner	455 East Calaveras Blvd. Milpitas, CA 95035
Monte Sereno Planning Department	Brian Loventhal, City Planner	18041 Saratoga/Los Gatos Road Monte Sereno, CA 95030
Morgan Hill Community Development Department, Planning Division	David Bischoff, Director	17555 Peak Avenue Morgan Hill, CA 95037
Mountain View Community Development Department	Elaine Costello, Director	500 Castro Street Mountain View, CA 94039
Palo Alto Department of Planning and Community Development	Eric Reil, Chief Planning Official	PO Box 10250 Palo Alto, CA 94303

Agency	Contact	Address
San Jose Planning, Building & Code Enforcement	James Derryberry, Director	801 North 1st Street, Room 400 San Jose, CA 95110
Santa Clara Department of Planning	Geoffry Goodfellow, Director	1500 Warburton Avenue Santa Clara, CA 95050
Saratoga Community Development Department	James Walgren, Director	13777 Fruitvale Avenue Saratoga, CA 95070
San Francisco Planning Department	Gerald Green, Director	1660 Mission Street San Francisco, CA 94103
CA Department of Conservation	Ken Trott	801 K Street, 24th Floor Sacramento, CA 95814
CA Native American Heritage Commission	Debbie Tredway-Pilas	Native American Heritage Comm. 915 Capitol Mall, Room 364 Sacramento CA 95814
California Water Resources Control Board		901 P Street PO Box 100 Sacramento, CA 95812-0100
Airfield Development Bureau (5 copies)	Christopher Oswald	245 S. Spruce Ave. South San Francisco, CA 94080
City of San Francisco Public Library		100 Larkin Street San Francisco, CA 94102
Oakland City Library		505 14th Street Oakland, CA 94612
San Jose Public Library		180 W. San Carlos Street San Jose, CA 95113
Foster City Branch Library		1000 E. Hillsdale Blvd. Foster City, CA 94404
Fremont Main Library		2400 Stevenson Blvd. Fremont, CA 94538
Persons added following initial Draft EA circulation (March 20, 2000)		
Foster City (3 copies)	Marland Townsend, Council Member	610 Foster City Blvd. Foster City, CA 94404
Port of Oakland	Ms. Gale Statba Mr. Doug Mansel	530 Water Street Oakland, CA 94607
San Jose Airport Department (5 copies)	Mr. Cary Green	1732 North First, Suite 600 San Jose, CA 95112
Oakland International Airport (5 copies)	Kristi McKinney	
Sonoma County Library	Dana Evans	3rd and E Street Santa Rosa, CA 95404

Agency	Contact	Address
Sausalito Public Library		420 Litho Street Sausalito, CA 94965
San Bruno Public Library		701 Angus Ave. West San Bruno, CA 94066
Redwood City Public Library		1044 Middlefield Rd. Redwood, CA 94063
Menlo Park Library		800 Alma Street Menlo Park, CA 94025
City of Palo Alto Main Library		1213 Newell Road Palo Alto, CA 94303
City of Mountain View Public Library		585 Franklin Street Mountain View, CA 94041
Santa Clara Public Library		2635 Homestead Road Santa Clara, CA 95051
Hayward Public Library		835 C Street Hayward, CA 94541
Union City Library		34007 Alvarado Niles Rd. Union City, CA 94587
Berkeley Public Library		2121 Allston Way Berkeley, CA 94704
FAA Airports District Office	Joe Rodriquez	831 Mitten Road, Room 210 Burlingame, CA 94010
Save the Bay	David Nesmith	1600 Broadway, Suite 300 Oakland, CA 94612-2100
Protect Our Bay	Richard Zimmerman	1821 Grant Avenue, Suite 310 San Francisco, CA 94133-2441
San Jose International Airport	E. Ronald Blake Airport Commissioner	1732 N. First Street, Suite 600 San Jose, CA 95112-4538
County of Santa Clara Airport Land Use Comission	Robert Luten Commissioner	5515 Sierra Road San Jose, CA 95132
	Susan Delux	3333 Paradise Drive Tiburon, CA 94920
Santa Clara County Society of Internal Medicine	Kenneth Hayes, M.D.	1155 Emory Street San Jose, CA 95126-1705

U.S. Department
of Transportation

Federal Aviation
Administration

Western-Pacific Region

P.O. Box 92007
Worldway Postal Center
Los Angeles, CA 90009

December 21, 1999

NOTICE OF PROPOSED ACTION AND PREPARATION OF ENVIRONMENTAL ASSESSMENT
for
SIMULTANEOUS OFFSET INSTRUMENT APPROACH (SOIA)/PRECISION RUNWAY MONITOR (PRM) PROJECT
at
SAN FRANCISCO INTERNATIONAL AIRPORT (SFO)

In cooperation with SFO, the Federal Aviation Administration (FAA) proposes to install and operate an Instrument Landing System (ILS) at SFO to provide the capability of a Simultaneous Offset Instrument Approach (SOIA) with a Precision Runway Monitor (PRM). The ILS consists of two ground-based facilities including a Localizer and Glide Slope. The PRM is a radar facility that locates and displays each aircraft's position, thereby providing proper separation between aircraft on final approach to parallel runways under certain weather conditions. The PRM will allow air traffic controllers to observe the progress of each aircraft and issue directions to pilots as required. In conjunction with the equipment installation, this document will assess the Federal action regarding airspace use and the approach procedures associated with the SOIA. Construction of the ground-based facilities is anticipated to begin and end during the summer of 2000. The use of the SOIA would begin as early as April or May of 2001.

As lead agency, the FAA is currently preparing an Environmental Assessment (EA) for the Proposed Action described below (see Attachment A). SFO is funding these efforts on behalf of the FAA, and has retained Parsons as the environmental contractor. The purpose of the EA is to evaluate the significance of any environmental impacts resulting from the installation and operation of the Proposed Action. As a part of the EA process, the FAA is requesting scoping comments on the Proposed Action prior to the completion and circulation of a Draft EA.

Please submit your comments regarding the Proposed Action to the address provided below by January 14, 2000.

Parsons
2233 Watt Avenue, Suite 330
Sacramento, CA 95825
Attention: Mr. Robert Brueck

DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action will provide for a SOIA at SFO Runway 28R, for use during periods of cloud cover between 3,500 and 1,600 feet. Three system components, including a localizer, glide slope, and PRM, are required to allow for the operation of the SOIA (Figure 1). In addition to the ground-based equipment, the SOIA will require changes in the final approach tracks to Runway 28R and a reconfiguration of feeder routes serving the approach.

The following discussion includes a description of the ground-based equipment and the SOIA.

Instrument Landing System (ILS)

The proposed ILS is one navigational aid that can be used during instrument flight rules (IFR) conditions. The purpose of the ILS is to provide information to the pilot regarding the approach of the aircraft relative to the runway centerline and proper path of descent. The ILS provides guidance by transmitting radio beams that can be used by aircraft avionics to navigate a final approach course to the airport. The proposed ILS consists of a localizer/distance measuring equipment (DME) and glide slope.

Localizer

The localizer provides horizontal guidance aligned with the offset runway centerline. The DME operates by sending out paired electronic pulses at a specific spacing from the aircraft. These pulses are then received by a transponder at a ground station. The ground station transmits paired impulses back to the aircraft at the same pulse spacing, but at a different frequency. The time between signal transmission and signal reception is measured by the airborne DME unit, and the slant distance in nautical miles is computed and displayed to the pilot.

The localizer/DME is an eight-element array; each element is approximately 5 feet high; the concrete pad for the localizer/DME array is approximately 10 feet by 50 feet. The localizer will be offset 3 degrees from Runway 28R centerline.

Glide Slope

The glide slope provides vertical guidance along the descent path of the aircraft. The glide slope antenna will be approximately 50 feet tall with a triangular base of about 2 – 3 feet per side. It will be located approximately 385 feet from the Runway 28R centerline, adjacent to an existing glide slope that serves Runway 28R. There may also be an 8 foot by 14 foot equipment shelter (to house the electronics) located adjacent to the existing glide slope.

Precision Runway Monitor (PRM)

The purpose of the PRM is to monitor aircraft on independent parallel approaches during periods of cloud cover between 3,500 and 1,600 feet. The PRM relates to the approach phase of flight, when aircraft landing on adjacent runways are at the same altitude with relatively small lateral spacing between them. The PRM locates and displays each aircraft's position, thereby providing proper separation between aircraft on final approach to parallel runways under certain weather conditions.

For the PRM display, the runway centerlines are extended along the approach path out to 15 nautical miles. A 2,000-foot wide "no transgression zone" is established between the extended runway centerlines and is designated by a red border on the controller's display screen. A "quick update-rate radar" and a computer track the aircraft and provide position updates to the controllers. If an aircraft's projected track vector enters the "no transgression zone," the aircraft's symbol changes from green to yellow. If the aircraft actually enters the "no transgression zone," the symbol changes to flashing red and an audible alarm is activated.

The PRM system consists of two equipment sites plus two Parrot (transponders) locations and cabling.

1. The Operations Site (OPS SITE) is where the displays and display driver cabinets are located at the San Francisco/Oakland Bay Terminal Radar Approach Control (Bay TRACON). The OPS SITE is in an area allocated for PRM use within the FAA Air Traffic Control spaces (known as TRACON or IFR Room).
2. The unmanned Transmitter/Receiver Site (T/R Site), where the radar interrogator and the electronically scanning (E-scan) antenna is located, will be positioned at the PRM tower site location at SFO. The PRM T/R Site antenna consists of a 17-foot diameter cylindrical E-scan antenna array located on an antenna support assembly (10 feet high) on top of a standard 67-foot airport surveillance radar (ASR) tower. This tower has a nominal cross-section of 24 feet square and is composed of 10 foot sections topped with a 15.8-foot high platform section. The antenna array electrical center is approximately 77 feet above ground level.
3. Two Parrots (transponders), to simulate fixed known aircraft locations for system monitoring, will be installed on the SFO airfield. Each Parrot is contained in a weatherproof steel enclosure.

Simultaneous Offset Instrument Approach (SOIA)

When weather conditions at SFO allow, aircraft approach in two parallel streams of traffic for approximately 60 landings per hour on Runways 28L and 28R. Under current operating procedures for reduced visibility weather conditions, aircraft approach in a single stream of traffic, rather than parallel streams, for approximately 30 landings per hour. The purpose of SOIA is to allow an increased flow of traffic onto both Runways 28L and 28R during periods of cloud cover between 3,500 feet and 1,600 feet, which occurs about 10 percent of the time. SOIA is estimated to increase the flow of traffic onto Runways 28L and 28R to a maximum of 40 to 45 landings per hour. This increase is accomplished by providing an increased lateral separation via the 28R offset approach track and through a more efficient design of the feeder route system in the Bay Area. SOIA will decrease delays in landing experienced during certain weather conditions, but it will not increase the capacity of the runway system. The Bay TRACON facility provides air traffic control for aircraft nearing final approach and/or soon after departure from area airports. The Bay TRACON serves the three primary airports in the region: SFO, Oakland International Airport (OAK), and San Jose International Airport (SJC).

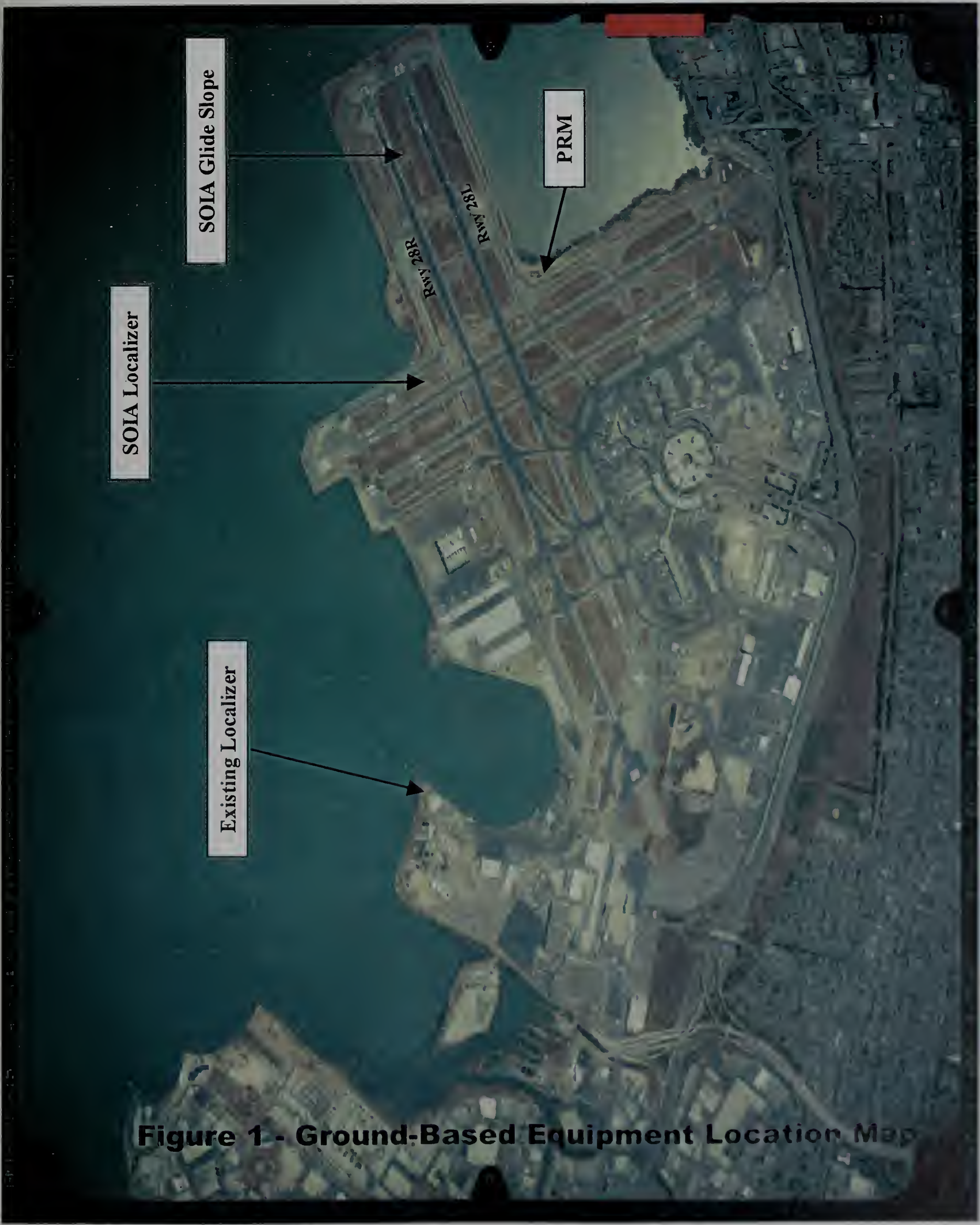


Figure 1 - Ground-Based Equipment Location Map

ATTACHMENT A

SFO SOIA/PRM EA SCOPE OF WORK

An Environmental Assessment will be prepared in conformance with National Environmental Policy Act (NEPA) and FAA guidelines. The EA will discuss, in appropriate detail, all relevant issues. Some issues will be addressed by referring to the Final Environmental Assessment for the Airport Master Plan Improvements, SFO, dated October 1998 (1998 Airport Master Plan EA). The 1998 Airport Master Plan EA evaluated the improvement of existing terminal facilities and construction of landside terminal and support facilities at SFO, and contains information relevant to the construction sites proposed for the localizer, glide slope and PRM. This document is available for review at the Airports Office of Planning and Environmental Affairs, Delta Building, 710 McDonnell Road, Suite N321.

The following contains a description of the work to be completed for each potential impact category that would be addressed in the Draft EA. Each section will contain a summary of the affected environment, impact evaluation criteria, environmental consequences, proposed mitigation measures and evaluation of the impact after mitigation.

Introduction and Summary

An introduction and summary will be prepared that provides an overview of the findings presented in the EA. The chapter will include the summary table and alternative analysis matrix. The chapter will also provide a discussion of mandated topics, including: irreversible or irretrievable commitments of resources; growth-inducing effects; and unavoidable adverse impacts. The environmentally preferred alternative will be identified based on a comparison of the potentially significant impacts associated with the Proposed Action and alternatives.

Affected Environment

A description of the affected environment will be prepared for each impact category identified in the environmental consequences section. The existing environment will be described at a level of detail necessary to provide an understanding of the significant impacts of the Proposed Action and alternatives.

Environmental Consequences and Mitigation Measures

The description of the affected environment will be followed by identification of the impact evaluation criteria and a discussion of the anticipated changes (impacts) to the environment from the Proposed Action and alternatives. Each impact analysis, including cumulative impacts, will consist of an impact heading (title), analysis of the impact in relation to the identified evaluation criteria, and significance of the impact prior to mitigation.

When an impact is determined to be significant or potentially significant, the environmental document will identify measures to avoid the impact (note: in situations where existing regulations or policies would mitigate a potential impact, the analysis will identify the existing regulation and conclude that the impact is less than significant). For potentially significant impacts, multiple and equally effective mitigation measures will be presented whenever possible. Each mitigation measure will include detail regarding the timing of mitigation implementation, responsibility for mitigation implementation, and, as necessary, the performance standards for determining mitigation effectiveness.

The general scope and content of each section of the EA will follow the proposed scope of work noted below.

Noise

A noise analysis will be performed of the proposed SOIA for SFO Runway 28L/R using the FAA's Integrated Noise Model (INM) for the following four cases:

- 1997 Baseline Demand - Do-Nothing (Existing Conditions)
- 1997 Baseline Demand - SOIA
- 2007 Demand - Do-Nothing
- 2007 Demand – SOIA

The work will be completed in three stages (tasks) according to the following:

Collect and Prepare INM Input Data - INM input data for the baseline cases will be adapted from the recent SFO Runway Reconfiguration Feasibility Study and Plan. The 1997 INM tracks will be checked and adjusted as necessary. Do-Nothing visual flight rules (VFR) and IFR approaches to Runway 28R will not be modeled as separate tracks, to conform with the 1998 Master Plan EA and Runway Reconfiguration Study. OAK and SJC flights will not be modeled as part of this project.

Run INM Cases and Analyze Results – The INM model will be exercised for each of the four cases identified and the results will be analyzed. Community noise equivalent level (CNEL) noise contours at 65, 70, and 75 dB will be produced for each case with INM-produced hardcopy showing the contours. In addition, files containing CNEL contour points in latitude/longitude format will be produced for importing into a geographic information systems (GIS) application. In addition, a table of the affected land area and population inside each respective CNEL noise contour and a table of CNEL values at location points will be produced for each case.

Noise Analysis Report – Using information obtained from the data collection and analysis, a Draft Noise Analysis Report will be prepared. This report will contain:

- Introductory material taken from the 1998 EA;
- Sections on study assumptions about runway usage, fleet mix, numbers of

operations, and ground tracks. Explanation of INM input data. Material drawn from 1998 EA and Runway Reconfiguration Study;

- Four INM-produced output graphics showing CNEL contours against a street map;
- Table comparing impacted land areas and populations across 4 cases;
- Table comparing CNEL at location points across 4 cases;
- Qualitative discussion of noise effects from changes to feeder routes; and
- Conclusions about noise impact of Do-Nothing vs. SOIA case.

Air Space

A description of SOIA and its compliance with federal regulations regarding restricted airspace will be prepared. Conformance will be judged using regulations set forth in 14 CFR Part 77. If conflicts are identified, the FAA will be advised to modify the project to reduce identified impacts to a less than significant level.

Compatible Land Use

No significant impacts to land use are anticipated. However, changes in flight tracks associated with the SOIA operations could result in perceived impacts from overhead flights in areas where overhead flights did not previously exist. Documentation will be prepared to describe the type and quantity of land uses that may now be affected by the new flight track locations.

Social Impacts

No new impacts to individuals or communities (i.e., relocations) are anticipated to result from the project.

Induced Socioeconomic Impact

Secondary or induced socioeconomic impacts will be discussed. However, no new impacts to individuals or communities are anticipated as a result of induced socioeconomic impacts.

Environmental Justice

Pursuant to Executive Order 12898, the potential for the project to cause disproportionate environmental impacts on low-income and minority communities will be evaluated. For purposes of analysis, the FAA uses the 65 CNEL noise contours as the basis for identifying low-income and minority communities that could be disproportionately affected by airport improvement projects. Existing demographic and housing information will be included, as appropriate, in the EA.

Air Quality

Air emissions will be estimated from construction activities and from the emergency generator for the PRM and ILS. The air emissions will be calculated using EPA emission factors or other emission factors approved by the Bay Area Air Quality Management District (BAAQMD). Necessary BAAQMD permits will be identified and addressed. Changes to air emissions from modified flight paths and possible reductions in flight delays will be qualitatively addressed.

Water Quality

Data from existing available sources will be assembled to provide a description of the surface hydrologic environmental setting. Information shall be provided to describe the local surface and subsurface hydrologic conditions. Impacts in drainage patterns, infiltration and/or runoff, and channeled surface flows will be discussed. Any impacts to surface water supplies including particulate matter, harmful chemicals, temperature, and harmful bacteria will be identified.

Transportation

It is anticipated that only traffic related to demolition of the existing localizer and construction of the ILS and PRM facilities will be analyzed. Based on construction activity information provided by SFO, the total and average number of daily construction truck trips will be estimated. Truck traffic impacts at key intersections and the US 101 and I-380 interchanges will be described based on existing traffic studies and environmental documents. Truck traffic volumes and haul routes will be described to identify potentially significant traffic and circulation impacts. Mitigation measures concerning truck access, safety, haul routes, and traffic/circulation conflicts will be identified to mitigate any significant impacts.

Finally, a determination of potential impact to historic property, public parks, or wildlife refuges will be made pursuant to DOT Section 4(f).

Cultural Resources

No impacts to cultural resources are anticipated.

Wildlife and Waterfowl, Threatened and Endangered Species, and Wetlands

Based upon existing information, a description of known and potential biological resources will be prepared. On the basis of aerial photography and field verification, a habitat map will be developed for any potential species of concern. The map will also identify plant communities, as necessary, for impact assessment and mitigation planning. Impacts will be assessed and mitigation will be proposed.

According to existing Airport mapping, there are no wetlands within the project's area of potential effect. Therefore, no new wetland delineation will be conducted.

Floodplains

No impacts to floodplains are anticipated.

Coastal Zones

The new project facilities will be located outside of the coastal zone. The demolition of the existing localizer is within the jurisdiction of the San Francisco Bay Conservation and Development Commission (BCDC) and has been coordinated. If the project facilities are relocated within the coastal zone management program boundaries or the BCDC boundaries, the scope of work will require amendment.

Wild and Scenic Rivers

The project will not affect wild or scenic rivers.

Prime and Unique Farmland

The project will not affect prime or unique farmland.

Light Emissions

A light emissions analysis will be prepared. However, it is anticipated that the new light sources will be compatible with the existing lighting associated with airport operations.

Electronic Emissions

Exposure levels of persons to radiofrequency (RF) radiation emitted by the PRM and ILS components will be calculated. RF exposure levels will be calculated for persons at the base of the PRM and at selected distances relative to adjacent land uses. Exposure levels will be compared with safety standards established by the FAA in Order 3910.1.A, Institute of Electrical and Electronic Engineers/American National standards Institute (ANSI/IEEE). The safety of PRM emissions will be determined based on conformance with those standards. In addition, the extent to which the PRM and ILS signals will add to exposure from other radio sources will be addressed.

Solid Waste

The project will not affect solid waste facilities or capacities.

Visual

A visual and aesthetics analysis will be prepared. Realistic color photo-simulations will be prepared to document views of the new facilities (PRM and ILS) from up to three viewpoints. It is anticipated that the new PRM and ILS facilities will be compatible with the existing visual environment associated with airport facilities.

Energy

No impacts to energy are anticipated.

Hazardous Materials

No impacts are anticipated as a result of hazardous materials. Existing documentation and a site survey to be performed by SFO will be utilized to describe the hazardous materials setting.

APPENDIX D
SCOPING COMMENTS

AIRPORT/COMMUNITY ROUNDTABLE
San Francisco International Airport and
Local Governments in San Mateo County

PARSONS HARLAND BARTHOLOMEW & ASSOCIATES
JAN 12 2000

Parsons
Attn: Mr. Robert Brueck
2233 Watt Avenue, Suite 330
Sacramento, CA 95825

January 5, 2000

SUBJECT: Scoping comments on the preparation of an Environmental Assessment for a proposed action to install and operate a Simultaneous Offset Instrument Approach (SOIA)/Precision Runway Monitor (PRM) at the San Francisco International Airport

Dear Mr Brueck:

This letter is in response to the December 21, 1999 Notice of Proposed Action for the preparation of an Environmental Assessment for a proposed action to install and operate a Simultaneous Offset Instrument Approach (SOIA)/Precision Runway Monitor (PRM) at the San Francisco International Airport. These comments represent the collective judgement of the Airport/Community Roundtable and were formally adopted by the Roundtable at the January 5, 2000 meeting.

The Airport/Community Roundtable was formed in 1981 after a three-year study of aircraft noise impacts in communities adjacent to the San Francisco International Airport. This study was jointly conducted by the County of San Mateo and the City and County of San Francisco. The Roundtable presently operates under a Memorandum of Understanding executed by 18 cities in San Mateo County, the County of San Mateo and the City and County of San Francisco.

Through its 18-year history, the Roundtable has been effective in identifying noise impacts in its member communities and in developing mitigation actions to address those impacts by working cooperatively with the San Francisco Airport Commission, the Federal Aviation Administration and the airline industry.

With its experience in addressing aircraft noise issues in the communities surrounding the San Francisco International Airport, the Roundtable is able to provide definitive comment on the noise analysis that should be conducted to identify noise impacts and appropriate mitigation measures.

With this in mind, the following comments are offered:

- The Roundtable formally supports the implementation of an off-set ILS for Runway 28R on the assumption that noise impacts in Foster City will be reduced by moving the arriving aircraft further over the Bay. Therefore, it is important that the noise evaluations that are provided in the Environmental Assessment clearly depict the noise reductions that are likely to occur in residential areas in Foster City with the introduction of the proposed project.

- It is understood that the FAA must use the 65 CNEL noise contour to define the noise impact boundary of the proposed project. However, the Roundtable requests that the 60 dB CNEL noise contour also be included in the noise analysis, as this level better reflects the community noise impacts in the Foster City and neighboring areas, due to the large amount of arrival traffic on Runway 28R.

- It is not likely that the CNEL noise metric will show significant noise reductions when a 12-month period average time period is used. Therefore, the analysis should identify changes to single event noise levels at RMS 12 in Foster City befor and after the implementation fo the off-set ILS. The L_{max} and Time Above metrics should be used to evaluate the changes in single-event noise levels with and without the project.

- The noise evaluation should indicate whether or not additional over flights and noise impacts would be introduced in populated areas as a result of the use of the off-set ILS procedure.

- The noise evaluation should indicate whether or not there would be any compromise or diminution of existing noise abatement procedures as a result of the use of the off-set ILS procedure.

Yours very truly,

Mary Griffin

Mary Griffin, Chairperson
Member, San Mateo County Board of Supervisors

cc: Members of the Roundtable
John Martin
John Costas
Roger Chinn
Andy Richards

Air Resources Board

Winston H. Hickox
Agency Secretary

Alan C. Lloyd, Ph.D.
Chairman
2020 L Street • P.O. Box 2815 • Sacramento, California 95812 • www.arb.ca.gov

Gray Davis
Governor

PARSONS HARLAND BARTHOLOMEW & ASSOCIATES
JAN [illegible] 2000

January 6, 2000

Mr. Robert Brueck
Parsons
2233 Watt Avenue, Suite 330
Sacramento, California 95825

Dear Mr. Brueck:

Thank you for providing the Air Resources Board the opportunity to review the December 21, 1999, Notice of Proposed Action for Simultaneous Offset Instrument Approach /Precision Runway Monitor Project at San Francisco International Airport and the Scoping Memorandum describing the work being undertaken for the Environmental Assessment (EA) of the project.

We have reviewed the Notice and the Scoping Memorandum to assess the proposed project's potential air quality impacts. We note that in the description of work for assessing air quality impacts, the EA proposes to assess qualitatively the air quality impacts of the change in flight paths. We recommend that the assessment be quantitative to ensure full disclosure of the potential air quality impacts on the areas under the new flight paths.

Thank you again for the opportunity to comment on the Scoping Memorandum. We look forward to reviewing the Environmental Assessment.

Please call me at (916) 322-8474 if you have any questions.

Sincerely,

Gary Honcoop

Gary Honcoop, Manager
Strategic Analysis and Liaison Section

TOWN OF COLMA
PLANNING DEPARTMENT
1190 El Camino Real • Colma, California 94014
Phone: (650) 985-2590 • FAX: (650) 985-2578

January 11, 2000

Mr. Robert Brueck
C/o Parsons
2233 Watt Avenue, Suite 330
Sacramento, CA 95825

PARSONS [illegible] BARTHOLOMEW & ASSOCIATES
JAN 13 2000

RE: Notice of Preparation re San Francisco Airport SOIA and PRM

Dear Mr. Brueck:

Thank you for including the Town of Colma in your list of contacts. We have no comments at this time.

Sincerely,

Malcolm C. Carpenter, AICP
City Planner
MCC/s

CONVERSATION RECORD

TIME

DATE 2/7/00

TYPE ☐ VISIT ☐ CONFERENCE ☒ TELEPHONE

☐ INCOMING

☒ OUTGOING

Location of Visit/Conference:

ROUTING

NAME	INIT
Rob Brueck	
File	

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (office, dept., bureau, etc.)	TELEPHONE NO.
David Marshall	Bay Area Air Quality Management District	(415) 749-4678

SUBJECT SFIA PRM - 736312

SUMMARY

David Marshall with BAAQMD returned my call, originally placed to Edward Miller (Mr. Mussen retired). He said that the BAAQMD considered this to be a small project, compared to the airport expansion, with relatively little potential for significant impacts. He had no comments beyond what is already described in the scoping memo.

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Molly Enloe	Molly	2.7.00

ACTION TAKEN

SIGNATURE	TITLE	DATE

PARSONS HARLAND BARTHOLOMEW & ASSOCIATES, INC.

CONVERSATION RECORD	TIME	DATE 2/7/00

TYPE ☐ VISIT ☐ CONFERENCE ☒ TELEPHONE

Location of Visit/Conference:

☐ INCOMING

☒ OUTGOING

ROUTING	
NAME	INIT
Rob Brueck	
File	

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (office, dept., bureau, etc.)	TELEPHONE NO.
Mark Littlefield	U.S. Fish & Wildlife Service	(916) 414-6600

SUBJECT SFIA PRM - 736312

SUMMARY

Mark Littlefield with USFWS said that he had reviewed and filed the NOP and did not have any comments on it. He suggested that we call Pat Port with the Dept. of Interior to see if any other agencies had comments. Her number is (415) 427-1477.

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Molly Enloe	Molly	2-7-00

ACTION TAKEN

SIGNATURE	TITLE	DATE

PARSONS HARLAND BARTHOLOMEW & ASSOCIATES, INC.

CONVERSATION RECORD	TIME	DATE 2/7/00

TYPE ☐ VISIT Location of Visit/Conference:	☐ CONFERENCE	☒ TELEPHONE ☐ INCOMING ☒ OUTGOING	ROUTING	
			NAME	INIT
			Rob Brueck	
NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU Carl Wilcox	ORGANIZATION (office, dept., bureau, etc.) CDFG	TELEPHONE NO. (707) 944-5525	File	

SUBJECT SFIA PRM - 736312

SUMMARY

Carl Wilcox left a voice mail in response to my voice mail. He said he reviewed the NOP and it appeared that the scoping memo covered all of the issues. He did not have any additional comments.

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION Molly Enloe	SIGNATURE Molly	DATE 2-7-00

ACTION TAKEN

SIGNATURE	TITLE	DATE

PARSONS HARLAND BARTHOLOMEW & ASSOCIATES, INC.

CONVERSATION RECORD		TIME	DATE 2/10/00

TYPE	☐ VISIT	☐ CONFERENCE	☒ TELEPHONE	ROUTING	
Location of Visit/Conference:			☐ INCOMING	NAME	INIT
			☒ OUTGOING	Rob Brueck	

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (office, dept., bureau, etc.)	TELEPHONE NO.	File	
Steve Moore	Regional Water Quality Control Board	(415) 622-2439		

SUBJECT SFIA PRM - 736312

SUMMARY

Steve Moore with RWQCB said that he had reviewed the NOP and did not have any written comments to submit. His only comment on this project is that standard construction practices for the protection of water quality should be implemented.

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION Molly Enloe	SIGNATURE Molly	DATE

ACTION TAKEN

SIGNATURE	TITLE	DATE

PARSONS HARLAND BARTHOLOMEW & ASSOCIATES, INC.

STATE OF CALIFORNIA – THE RESOURCES AGENCY GRAY DAVIS, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@mail2.quiknet.com

February 11, 2000

REPLY TO: FAA991222A

PARSONS HARLAND BARTHOLOMEW & ASSOCIATES
FEB 18 2000

Robert Brueck
Parsons Engineering Science
2233 Watt Avenue
SACRAMENTO CA 95825

Re: Notice of Proposed Action and Preparation of Environmental Assessment for Simultaneous Offset Instrument Approach/Precision Runway Monitor Project, San Francisco International Airport, San Francisco County.

Dear Mr. Brueck:

Thank you for submitting to our office your December 21, 1999 Notice of Proposed Action and Preparation of Environmental Assessment (NPA/PEA) for the Simultaneous Offset Instrument Approach (SOIA)/Precision Runway Monitor (PRM) Project, San Francisco International Airport (SFO), San Francisco County. You are seeking our comments on this document in accordance with 36 CFR 800, regulations effective June 17, 1999 implementing Section 106 of the National Historic Preservation Act. Be advised that Section 106 requires agencies to take into account the effects of their undertakings on historic properties. 36 CFR Part 800, the implementing regulations for Section 106, defines how Federal Agencies meet these statutory responsibilities

Our review of the submitted documentation leads us to recommend that the FAA do the following to fulfill its responsibilities for the identification and evaluation of historic resources for this project as set forth in 36 CFR 800:

- Consult with the SHPO to determine and document the area of potential effects, as defined in §800.16(d).

- Seek information from consulting parties, and other individuals and organizations likely to have knowledge of, or concerns with, historic properties in the area, pursuant to 36 CFR 800.4(a)(3).

- Pursuant to §800.4(b)-(c), identify and provide information on any historic properties that may be affected by the project and gather sufficient information to evaluate the eligibility of these properties for the National Register of Historic Places (NRHP). This information should include information on the age of the property, its historical significance, if any, as well as historical and/or current photographs of the property.

- Determine what effect if any the undertaking will have on historic properties pursuant to 36 CFR 800.5

This letter represents neither acknowledgement that the FAA has consulted with the State Historic Preservation Officer (SHPO) under any applicable law or regulation nor evidence of satisfactory FAA compliance with Section 106 for the undertaking.

We are prepared to provide such evidence in writing after we receive correspondence from the FAA requesting our comments on its determination that a geographic area associated with this undertaking either does not contain historic properties or does contain historic properties that will not be affected.

Thank you again for seeking our comments on your project. If you have any questions, please contact staff historian Clarence Caesar at (916) 653-8902.

Sincerely,

Daniel Abeyta, Acting
State Historic Preservation Officer

STATE OF CALIFORNIA
GRAY DAVIS, *Governor*

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
THIRTY VAN NESS AVENUE, SUITE 2011
SAN FRANCISCO, CALIFORNIA 94102-6080
PHONE: (415) 557-3686
http://ceres.ca.gov/bcdc/

bcdc
Celebrating
35 Years

February 17, 2000

FEB 19 2000

Robert Brueck
Parsons, Harland, Bartholomew & Associates, Inc.
2233 Watt Avenue, Suite 330
Sacramento, California 95825

Dear Mr. Brueck:

We appreciate your staff's effort to bring the Notice of Proposed Action and Preparation of Environmental Assessment for the SOI/PRM project to our attention. We also acknowledge your extension of the time limit to enable us to comment.

We support the use of technology such as Simultaneous Offset Instrument Approach with a Precision Runway Monitor. The Notice states that the implementation of this project could reduce weather delays by up to 50%under reduced visibility weather conditions on Runways 28L and 28R. This significant improvement should be related to the pending runway reconfiguration proposal at SFO. It might reduce the need for additional or reconfigured runways and any resulting Bay fill. We believe that his should be addressed directly in the Environmental Assessment.

The Scoping Memorandum states that "[t]he new project facilities will be located outside of the coastal zone. The demolition of the existing localizer is within the jurisdiction of the San Francisco Bay Conservation and Development Commission (BCDC) and has been coordinated." If the project facilities are relocated within the Commission's jurisdiction under the McAteer-Petris Act, the work would require a consistency determination under the federal Coastal Zone Management Act. If the project facilities are relocated outside the Commission's jurisdiction, but to a location or in a manner that would affect the coastal zone, then it is possible that a consistency determination may be required. When the project details are finalized, the F.A.A. should contact us for a final determination.

The Scoping Memorandum outlines an adequate Environmental Assessment. We believe that the addition of a discussion about the relationship to runway reconfigurations and expansions under consideration at SFO is essential. The cost-effective reduction of delay anticipated by the project would be a welcome example of delay reduction without Bay fill.

Again, thank you for the opportunity to comment on the Proposed Action.

Very truly yours,

STEVEN A. McADAM
Deputy Director

SAM/mm

Dedicated to making San Francisco Bay better

APPENDIX E

COMPATIBLE LAND USE AND FACILITIES DATA

Specific Facilities to be Overflown by the New SFO Flight Paths

ALAMEDA COUNTY

Jurisdiction	Land Use	Facility	Flight Path
Hayward	Resource Management	Hayward Regional Shoreline	Golden Gate STAR
	Parks	Weeks Park Industrial Park Tennyson Park Greenwood Park Eden Greenway Southgate Park Twin Bridges Park	Golden Gate STAR
	Historical	Dry Creek Pioneer Regional Park	Golden Gate STAR
	Industrial	Cargill	Golden Gate STAR
	Commercial	Gateway Plaza Fairway Park Southland Mall	Golden Gate STAR
	Institutional	Chabot College American Heritage Christian High Sch. Elementary Schools (6)	Golden Gate STAR
	Public Facilities	Hayward Air Terminal Mission Hills of Hayward Golf Course BART East Bay Corridor	Golden Gate STAR
	Defense	California Air National Guard	Golden Gate STAR
Union City	Open Space	Hill-faces	Golden Gate STAR
	Institutional	Elementary Schools (2) Middle School (1) Masonic Home for Adults	Golden Gate STAR
	Parks	Seven Hills Park	Golden Gate STAR
	Agriculture		Golden Gate STAR
Fremont	Public Facilities	Sunny Hills Golf Club	Golden Gate STAR
	Industrial	Cargill	Golden Gate STAR
	Open Space	Bayside Hill-face	Golden Gate STAR
	Commerical	Various	Golden Gate STAR
	Resource Management	Don Edwards SF Bay NWR	Golden Gate STAR

Specific Facilities to be Overflown by the New SFO Flight Paths

ALAMEDA COUNTY

Jurisdiction	Land Use	Facility	Flight Path
Newark	Open Space	Bayside	Golden Gate STAR
	Resource Management	Don Edwards SF Bay NWR	Golden Gate STAR
Unincorporated	Large Parcel Agriculture	Private Ranches	Golden Gate STAR
	Resource Management	Ohlone Regional Wilderness	Golden Gate STAR
	Major Parks	Stony Brook Park Camp Ohlone Pleasanton Ridge Regional Park	Golden Gate STAR
	Water Management	Alameda Diversion Tunnel Calaveras Reservoir San Antonio Reservoir	Golden Gate STAR
	Public Institutional	Elementary School (1)	Golden Gate STAR

Specific Facilities to be Overflown by the New SFO Flight Paths

SAN JOAQUIN COUNTY

Jurisdiction	Land Use	Facility	Flight Path
Unincorporated	Agriculture	Private Ranches	Modesto Arrival
	Water Management	California Aqueduct Delta Mendota Canal	Modesto Arrival
	Public Facility	Carnegie State Vehicular Recreation Area	Modesto Arrival

Specific Facilities to be Overflown by the New SFO Flight Paths

SAN MATEO COUNTY

Jurisdiction	Land Use	Facility	Flight Path
Portola Valley	Conservation Residential	Low density	Golden Gate Star
	Open Space Preserve	Windy Hill Open Space Preserve	Golden Gate Star
	Open Space		Golden Gate Star
Woodside	Rural Residential	Low density	Golden Gate Star
Unincorporated	Agriculture	Private Ranches	Golden Gate Star & Oceanic Arrivals
	Open Space	Los Trancos Open Space Coal Creek Open Space Russian Ridge Open Space Windy Hill Open Space	Golden Gate Star
	Rural Residential	Low density	Golden Gate Star
	Resource Management	San Francisco State Fish & Game Refuge	Golden Gate Star
	Parks	Wunderlich County Park Huddart County Park	Golden Gate Star
	Water Management	Upper Crystal Springs Reservoir Hetch Hetchy Aqueduct	Golden Gate Star
	Public Institutional	San Francisco International Airport	Golden Gate Star

Specific Facilities
to be Overflown by
the New SFO Flight
Paths

SANTA CLARA COUNTY

Jurisdiction	Land Use	Facility	Flight Path
Milpitas	Residential/Hillside	Very low density	Modesto Arrival
	Public Parks/Recreation	Starlight Park Dixon Landing Park	Golden Gate STAR
		Coyote Creek corridor	Golden Gate STAR, Modesto Arrival, Big Sur STAR & Oceanic Arrivals
	Industrial/Industrial Park	Cisco Systems	Golden Gate STAR, Big Sur STAR & Oceanic Arrivals
	Commercial Highway Service	Various facilities	Golden Gate STAR, Big Sur STAR & Oceanic Arrivals
	Commercial	McCarthy Ranch	Golden Gate STAR, Modesto Arrival, Big Sur STAR & Oceanic Arrivals
	Correctional Facility	Elmwood Correctional Facility	Golden Gate STAR, Big Sur STAR & Oceanic Arrivals
	Residential/Single Family	Various facilities	New Golden Gate STAR, Big Sur STAR & Oceanic Arrivals
San Jose	Open Space	Coyote Creek corridor	Golden Gate STAR, Modesto Arrival, Big Sur STAR & Oceanic Arrivals
	Public Facilities	SJSC Water Pollution Control Plant (WPCP)	Golden Gate STAR, Modesto Arrival, Big Sur STAR & Oceanic Arrivals
		VTA Tasman/Great Mall Light Rail Corridor	Golden Gate STAR, Modesto Arrival, Big Sur STAR & Oceanic Arrivals
		San Jose International Airport	Golden Gate STAR, Big Sur STAR & Oceanic Arrivals

Specific Facilities
to be Overflown by
the New SFO Flight
Paths

SANTA CLARA COUNTY

Jurisdiction	Land Use	Facility	Flight Path
San Jose	Water Management	Hetch Hetchy Aqueduct	Golden Gate STAR, Modesto Arrival, Big Sur STAR & Oceanic Arrivals
		Santa Clara Valley Water District's Coyote Creek project	Golden Gate STAR, Modesto Arrival, Big Sur STAR & Oceanic Arrivals
	Industrial	Various facilities	Golden Gate STAR, Big Sur STAR & Oceanic Arrivals
	Residential	Low density	Golden Gate STAR, Big Sur STAR & Oceanic Arrivals
		Medium density High density	Big Sur STAR
	Commercial	Various	Big Sur STAR
	Commercial	Stevens Creek Center Orchard farms Center De Anza Center Saratoga Square Saratoga Plaza Huntington Village	Oceanic Arrivals
		Valley Fair Town & Country Village West Park Plaza Various facilities	Big Sur STAR
	Public Institutions	Elementary schools (5) Junior high school (1) Archbishop Mitty High School Lynbrook High School	Oceanic Arrivals
		Elementary school (1)	Golden Gate STAR, Big Sur STAR & Oceanic Arrivals
		Middle school (1) Del Mar High School San Jose City College	Big Sur STAR
		Santa Clara Valley Medical Center	Big Sur STAR
		Columbia Good Samaritan Hospital	Big Sur STAR
	Parks	Calabazas Park Rainbow Park Mise Park	Oceanic Arrivals

Specific Facilities to be Overflown by the New SFO Flight Paths

SANTA CLARA COUNTY

Jurisdiction	Land Use	Facility	Flight Path
Santa Clara	Water Management	Santa Clara Valley Water District's Guadalupe River Project	Golden Gate STAR
	Industrial	Various facilities	Golden Gate STAR
	Commerical	Various facilities	Golden Gate STAR
		Pruneridge Center El Camino Center Mariposa Gardens Center Lawrence Station Center	Golden Gate STAR
	Public Institutions	Santa Clara University Middle school (1) Elementary schools (5)	Golden Gate STAR, Big Sur STAR & Oceanic Arrivals
		Elementary schools (6) Continuing High Scholl Santa Clara High School Kaiser Foundation Hospital	Golden Gate STAR
	Parks	Maywood Park Marv Gomez Park Henry Schmidt Park Washington Park	Golden Gate STAR, Big Sur STAR & Oceanic Arrivals
		Lafayette Park Fremont Park Central Park Homeridge Park Jenny Strand Park Westwood Oaks Park	Golden Gate STAR
	Residential	Medium density High density	Golden Gate STAR, Big Sur STAR & Oceanic Arrivals
Campbell	Commercial	The Pruneyard Hamilton Plaza	Big Sur STAR
	Residential	Medium density High density	Big Sur STAR
Unincorporated	Ranchlands	Private Ranches	Modesto Arrivals
	Resource Conservation Areas	Hillsides	Modesto Arrivals Oceanic Arrivals Golden Gate STAR Big Sur STAR
	Other Public Open Lands	Hillsides	Golden Gate STAR, Big Sur STAR & Oceanic Arrivals
	Mining	Limekiln Mine	Big Sur STAR

Specific Facilities
to be Overflown by
the New SFO Flight
Paths

SANTA CLARA COUNTY

Jurisdiction	Land Use	Facility	Flight Path
Unincorporated	Residential	Medium density	Big Sur STAR
	Rural Residential	Low density	Big Sur STAR
	Commercial	Various facilities	Big Sur STAR
	Open Space	Fremont Older Open Space Picchetti Ranch Open Space Saratoga Gap Open Space	Oceanic Arrivals
		Monte Bello Open Space Rancho San Antonio Open Space Los Trancos Open Space	Golden Gate STAR
	Water Management	Calaveras Reservoir	Golden Gate STAR
		Lexington Reservoir	Big Sur STAR
	Parks	Stevens Creek County Park Upper Stevens Creek County Park	Oceanic Arrivals
		Lexington Reservoir County Park	Big Sur STAR
Saratoga	Open Space Private Ownership	Saratoga Country Club	Oceanic Arrivals
	Residential	Medium density Hillside Conservation	Oceanic Arrivals
Los Gatos	Commercial	Various facilities	Big Sur STAR
	Office Professional	Various	Big Sur STAR
	Hillside Residential	Low density	Big Sur STAR
	Low Density Residential	Low density Medium density	Big Sur STAR
	Open Space	Blossom Hill Park Live Oak Manor Park	Big Sur STAR
		Mid-peninsula Open Space District	Big Sur STAR
	Schools	Elementary schools (2) Los Gatos High School	Big Sur STAR
Sunnyvale	Public Institution	Junior high school (1) Elementary school (1)	Golden Gate STAR
	Residential	Medium density	Golden Gate STAR

Specific Facilities
to be Overflown by
the New SFO Flight
Paths

SANTA CLARA COUNTY

Jurisdiction	Land Use	Facility	Flight Path
Cupertino	Public Facilities	Cupertino High School Junior high school (1)	Oceanic Arrivals
		Homestead High School	Golden Gate STAR
	Office/Industrial/ Commercial/Residential	Various	Golden Gate STAR
	Commercial/Residential	Vallco Fashion Park The Oaks Center Homestead Square Cupertino Village	Golden Gate STAR
		Various facilities	Oceanic Arrivals
	Residential	Very low density	Golden Gate STAR
		Low density Medium/low density Medium/high density High density	Golden Gate STAR & Oceanic Arrivals
	Public Open Space		Golden Gate STAR
	Parks	Three Oaks Park Hoover Park	Oceanic Arrivals
		Portal Park Memorial Park Varian Park	Golden Gate STAR
Palo Alto	Open Space/Controlled Development	Hill-face slopes	Golden Gate STAR
	Publicly Owned Conservation Land	Low density	Golden Gate STAR

Specific Facilities
to be Overflown by
the New SFO
Flight Paths

SANTA CRUZ COUNTY

Jurisdiction	Land Use	Facility	Flight Path
Unincorporated	Agriculture	Private Ranches	Oceanic Arrivals & Big Sur Star
	Mining	Quail Hollow Quarry	Big Sur Star
	Open Space	Long Ridge Open Space	Oceanic Arrivals
	Rural Residential	Low density	Big Sur Star
	Parks	Quali Hollow Ranch County Park	Big Sur Star

APPENDIX F

FAA LETTER OF RESPONSE TO STATE HISTORIC PRESERVATION OFFICE

U.S. Department
of Transportation

**Federal Aviation
Administration**

Western-Pacific Region

P.O. Box 92007
Worldway Postal Center
Los Angeles, CA 90009

PARSONS HARLAND BARTHOLOMEW & ASSOCIATES
MAR 1 2000

MAR 3 2000

Mr. Daniel Abeyta
Acting State Historic Preservation Officer
Office of Historic Preservation
Department of Parks and Recreation
P. O. Box 942896
Sacramento, CA 94296-0001

Dear Mr. Abeyta:

The Federal Aviation Administration (FAA) and San Francisco International Airport (SFO) are preparing an Environmental Assessment (EA) for the installation of a Precision Runway Monitor and Instrument Landing System. The purpose of the proposed action is to install the necessary navigational equipment to conduct simultaneous offset instrument approaches to parallel runways 28L and 28R at SFO.

Although federal funds will not be used for this project, the installation and operation of this system must be accomplished in accordance with FAA regulations. Therefore, the project is considered an "undertaking" as defined by Title 36 Code of Federal Regulations (CFR) Part 800.16(y) and therefore, subject to the requirements of the National Historic Preservation Act of 1966, as amended.

The FAA has defined the Area of Potential Effect (APE) for this undertaking as three separate equipment location sites, as identified on Enclosure (1). The sites, illustrated in the photographs of Enclosure (2), depict areas currently built upon or disturbed. These three sites are located either adjacent to a taxiway or between the runways.

A historical and cultural resource study has recently been conducted for the airport. This study supported the SFO Master Plan EA (1998). A review of this study concluded that the airfield was constructed of fill material and that no historical or cultural resources are located in the three APE sites. Therefore, based on the results contained within this study, the FAA has determined in accordance with Title 36 CFR Part 800.3(a)(1) that the proposed undertaking has no potential to cause effects on archaeological or historic properties listed or eligible for listing on the National Register of Historic Places. It is our intent to incorporate this information and the results of the coordination effort into the EA.

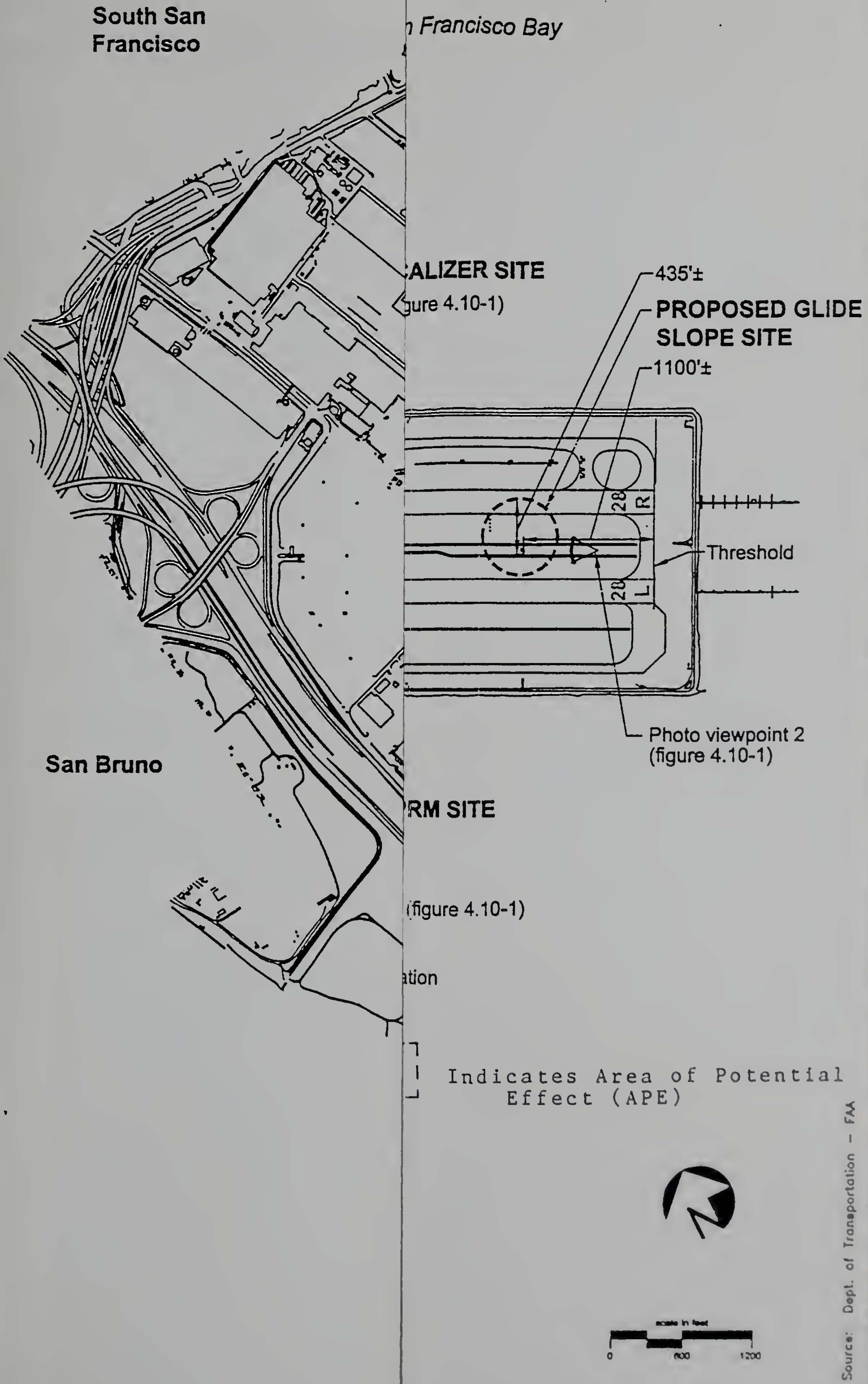
To further fulfill the FAA's obligation under Title 36 CFR Part 800.4(d), interested parties and agencies will be notified of our determination through publication of the draft EA. The FAA believes that this action, along with the December 21, 1999, scoping letter and a public meeting to be held on the draft EA, will fulfill our obligations under Title 36 CFR Part 800.4(a). We respectfully request your concurrence with this determination.

If we can be of further assistance, please contact Mr. Charles Lieber, Environmental Specialist, at (310) 725-6535.

Sincerely,

John Clancy
Manager, Air Traffic Division

Enclosures (2)



Source: Dept. of Transportation - FAA

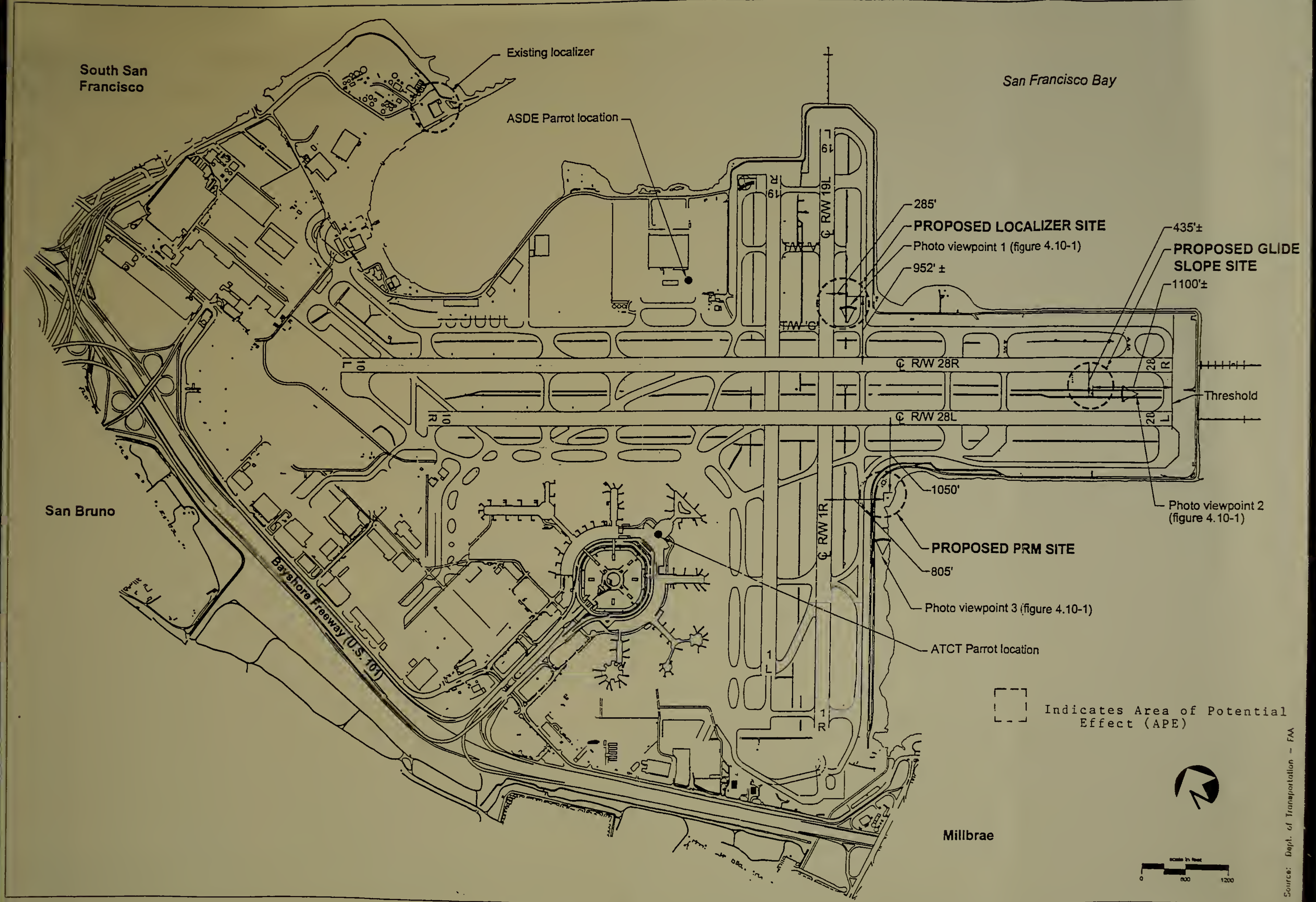
Figure 1-2

San Francisco Airport Site

PARSONS
HARLAND BARTHOLOMEW
& ASSOCIATES, INC.

SFO
SOIA/PRM EA

ENCL (1)



Source: Dept. of Transportation - FAA

SFO
SOIA/PRM EA

San Francisco Airport Site

PARSONS
HARLAND BARTHOLOMEW
& ASSOCIATES, INC.

Figure 1-2

ENCL (1)

APPENDIX G

AMBIENT NOISE MEASUREMENTS

Forwarded to ATAC
1/5/2000

AMBIENT NOISE MEASUREMENTS
SAN FRANCISCO INTERNATIONAL AIRPORT

San Francisco, California

BBA Project No. 99-295

Prepared For

ATAC Corporation
757 N. Mary Avenue
Sunnyvale, CA 94086

January 5, 2000

Prepared By

Brown-Buntin Associates, Inc.
Fair Oaks, California

BBA

7996 California Ave., Suite A • Fair Oaks, CA 95628 • (916) 961-5822 • (916) 961-6418 Fax
319 W School Ave. • Visalia, CA 93291 • (559) 627-4923 • (559) 627-6284 Fax

BROWN BUNTIN

INTRODUCTION

The purpose of the noise measurements conducted for this phase of the project is to document existing (ambient) noise levels in areas which are or may be affected by revisions to aircraft flight procedures at San Francisco International Airport (SFIA). The measured noise levels can then be compared to the aircraft noise levels predicted using the FAA's Integrated Noise Model for the proposed changes in operations.

METHODS

The general vicinities of the noise monitoring locations were selected by ATAC Corporation based upon a preliminary review of aircraft flight paths and predicted aircraft noise levels. Brown-Buntin Associates, Inc. (BBA) selected five specific locations within the general areas based upon the availability of access, security and the relative lack of significant non-aircraft noise sources. Table I lists the measurement locations.

TABLE I
Ambient Noise Measurement Locations
SFIA Arrival Procedures Analysis

Site No.	General Description	Location	Remarks
1	I-680 and SR 184	City of San Francisco Water Department, Sunol	Agricultural property
2	SR 85 and Homestead	1567 Belleville Way, Sunnyvale	Residential property
3	Central and Hickory	37084 Laurel Street, Newark	Residential property
4	Williams and Eden	923 Eden Avenue, San Jose	Residential property
5	Alum Rock and Penitencia Creek	2928 Kentridge Drive, Milpitas	Residential property adjacent to a school

The noise measurements were conducted from midnight to midnight, including the dates of December 17-23, 1999. The measurement equipment consisted of Larson Davis Model 820B precision integrating sound level meters fitted with Bruel & Kjaer Type 4176 microphones, which meet the requirements of the American National Standards Institute (ANSI) for Type 1 sound level measurement systems. The meters were set to measure A-weighted[1] sound pressure levels (sound levels), using Slow meter response. Noise levels were measured continuously at the rate of 32 samples per second, and the data were summarized on an hourly basis, then stored internally.

---

[1] For explanation of these terms, refer to Appendix A: "Acoustical Terminology".

The meters were also set to log noise events exceeding 60 dBA for at least 5 seconds, which was intended to capture significant noise events for later analysis. This threshold value was selected to eliminate most background noise sources, which in most developed areas routinely are in the range of 50 to 55 dBA. In some cases, aircraft noise could be heard, but not distinguished in terms of the measured sound level, below the 60 dBA threshold value.

The meters were downloaded to a personal computer, and the Larson Davis Airport Noise Monitoring Software was used to analyze and report the data. The software was also used to screen the recorded noise events which exceeded 60 dBA, using the parameters of maximum noise level, event duration, and event symmetry to eliminate noise events which were not likely to be caused by aircraft. The software was then used to prepare a report listing the total Community Noise Equivalent Level (CNEL), the CNEL due to presumed aircraft noise events exceeding 60 dBA, and the CNEL due to other sources. The results of this analysis are listed in Table II. Hourly noise level statistics are illustrated by Figures 1 through 35, and are listed in Appendix B.

TABLE II
Measured CNEL Values at Monitoring Sites

Site	Date	Total CNEL, dB	Aircraft CNEL, dB	Background CNEL, dB
1	12/17/99	57.1	43.6	56.9
	12/18/99	55.6	38.4	55.5
	12/19/99	55.1	39.9	54.9
	12/20/99	57.1	44.1	56.9
	12/21/99	58.1	48.7	57.5
	12/22/99	56.2	46.0	55.8
	12/23/99	56.8	42.0	56.7
Average		56.7	44.5	56.2
2	12/17/99	63.3	45.5	63.2
	12/18/99	60.6	45.3	60.4
	12/19/99	59.9	45.8	59.7
	12/20/99	58.4	40.9	58.3
	12/21/99	61.6	42.6	61.5
	12/22/99	62.8	52.5	62.4
	12/23/99	63.2	49.9	63.0
Average		61.7	47.7	61.5
3	12/17/99	60.6	57.0	58.1
	12/18/99	61.3	58.1	58.5
	12/19/99	56.8	53.2	54.2
	12/20/99	57.1	52.0	55.4
	12/21/99	58.5	55.0	55.9
	12/22/99	58.4	53.9	56.5
	12/23/99	57.1	50.3	56.0
Average		58.9	54.9	56.6
4	12/17/99	61.4	46.1	61.3
	12/18/99	59.6	41.5	59.5
	12/19/99	59.0	41.7	58.9
	12/20/99	60.6	38.6	60.6
	12/21/99	60.4	46.8	60.2
	12/22/99	60.4	46.5	60.2
	12/23/99	58.4	41.9	58.3
Average		60.1	44.2	60.0

TABLE II Measured CNEL Values at Monitoring Sites				
Site	Date	Total CNEL, dB	Aircraft CNEL, dB	Background CNEL, dB
5	12/17/99	64.4	60.7	62.1
	12/18/99	61.9	57.0	60.2
	12/19/99	58.1	47.1	57.7
	12/20/99	60.3	55.3	58.6
	12/21/99	60.9	52.5	60.2
	12/22/99	65.1	60.8	63.1
	12/23/99	66.0	62.1	63.7
Average		63.2	58.6	61.3

FINDINGS

The existing noise environment at each of the selected noise monitoring locations appeared generally to be dominated by non-aircraft noise sources. In some cases, aircraft could be heard, but the noise level was below the 60 dBA event discrimination threshold. With the exception of some days at Site 5, where the noise level was probably school-related, the existing noise levels are relatively low, and within the range of noise levels usually expected in residential and rural areas.

Respectfully submitted,
Brown-Buntin Associates, Inc.

Jim Buntin

APPENDIX A
ACOUSTICAL TERMINOLOGY

AMBIENT NOISE LEVEL:	The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.
CNEL:	Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.
DECIBEL, dB:	A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
DNL/L_{dn}:	Day-Night Average Sound Level. The average annual equivalent sound level during a 24-hour day, obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.
L_{eq}:	Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. L_{eq} is typically computed over 1, 8 and 24-hour sample periods.

Note: L_{dn} represents the daily level of noise exposure averaged on an annual basis, while L_{eq} represents the average noise exposure for a shorter time period, typically one hour.

L_{max}:	The maximum sound level recorded during a noise event.
L_n:	The sound level exceeded "n" percent of the time during a sample interval. L_{10} equals the level exceeded 10 percent of the time (L_{90}, L_{50}, etc.)

APPENDIX A-2
ACOUSTICAL TERMINOLOGY

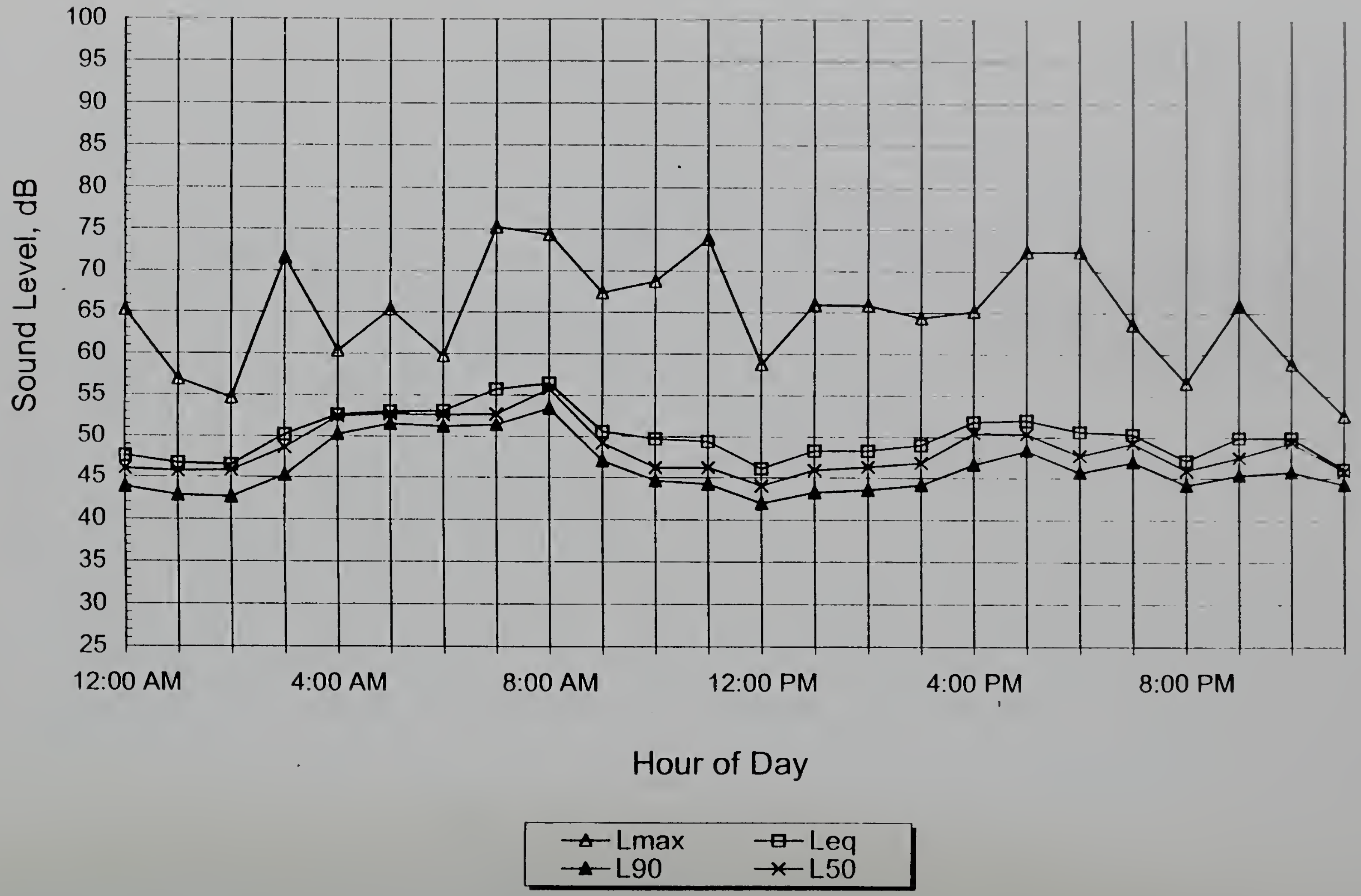
NOISE EXPOSURE CONTOURS:	Lines drawn about a noise source indicating constant levels of noise exposure. L_{dn} contours are frequently utilized to describe community exposure to noise.
SEL OR SENEL:	Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure level for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.
SOUND LEVEL:	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

APPENDIX B
MEASURED HOURLY NOISE LEVELS

Measured Hourly Noise Levels

Site 1: 505 Paloma Way- Sunol, CA

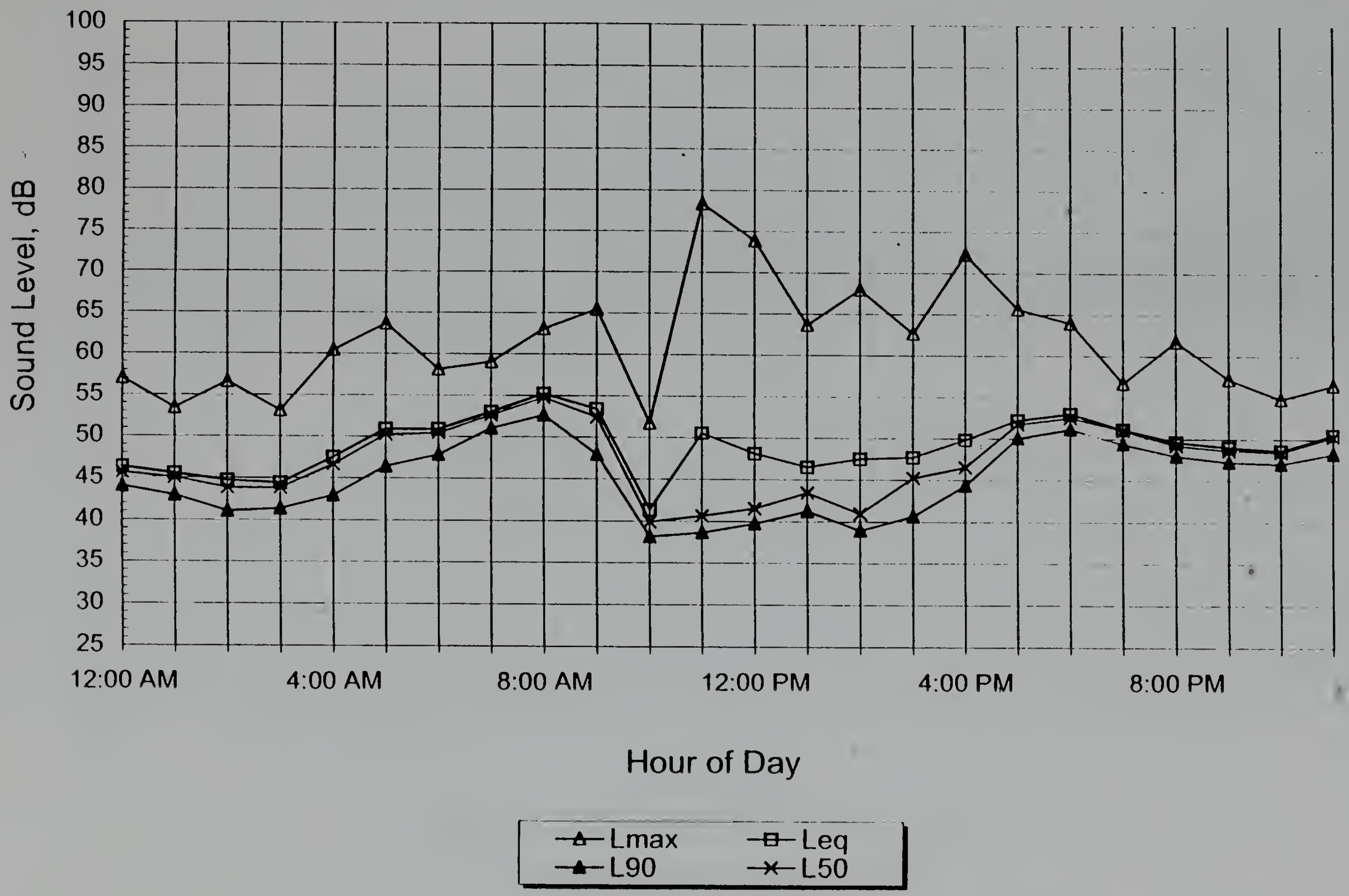
December 17, 1999



Measured Hourly Noise Levels

Site 1: 505 Paloma Way- Sunol, CA

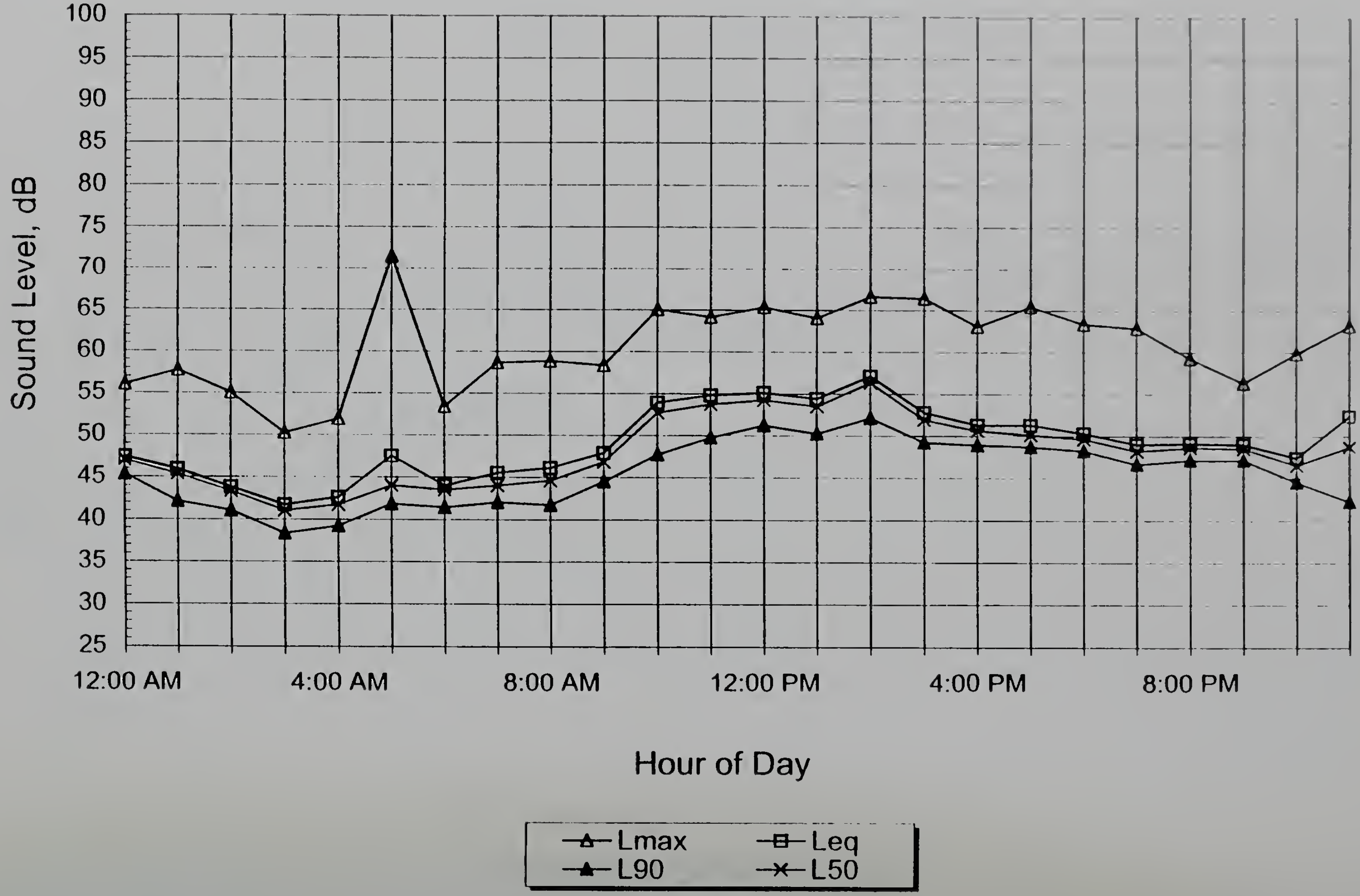
December 18, 1999



Measured Hourly Noise Levels

Site 1: 505 Paloma Way- Sunol, CA

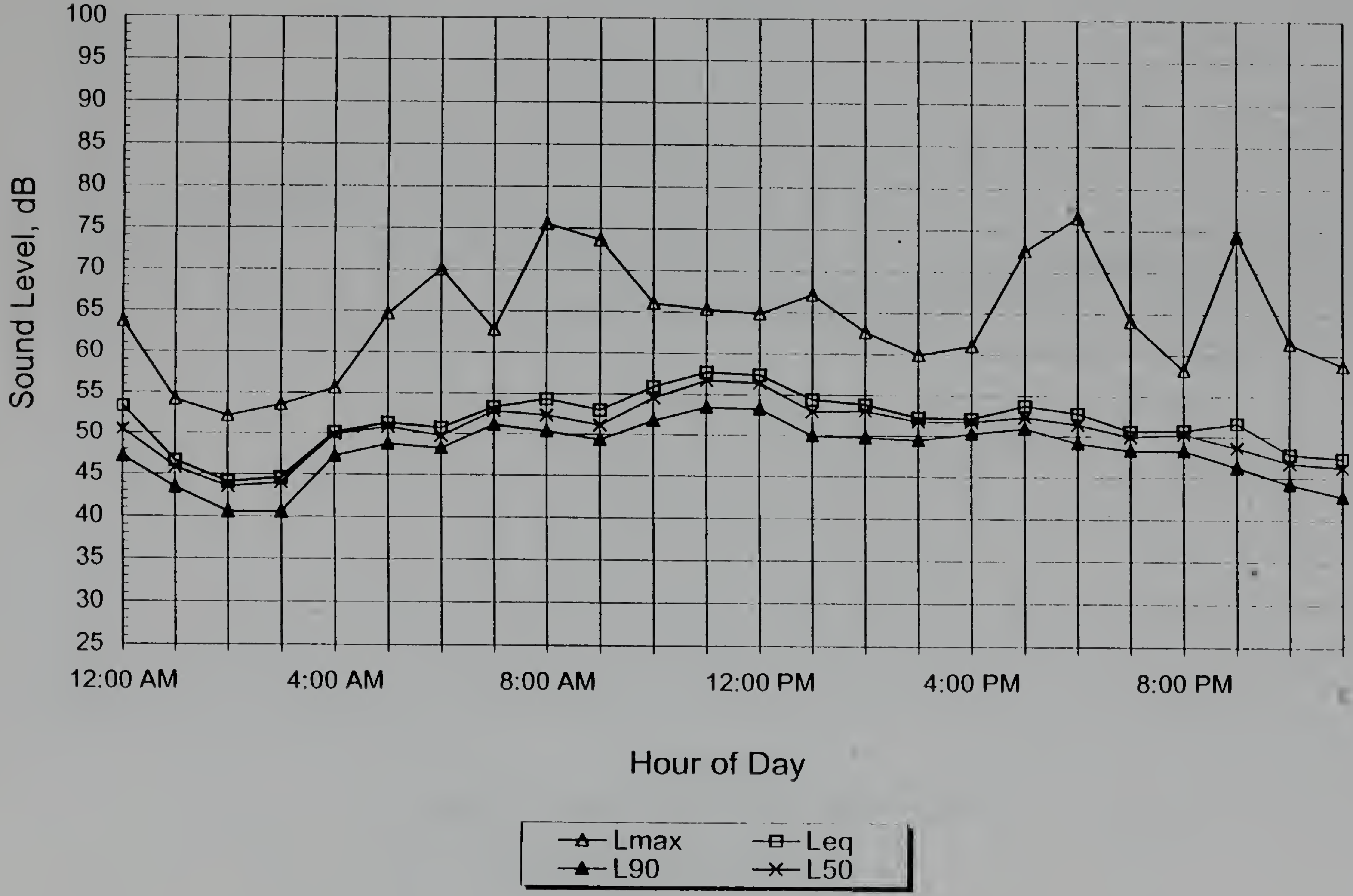
December 19, 1999



Measured Hourly Noise Levels

Site 1: 505 Paloma Way- Sunol, CA

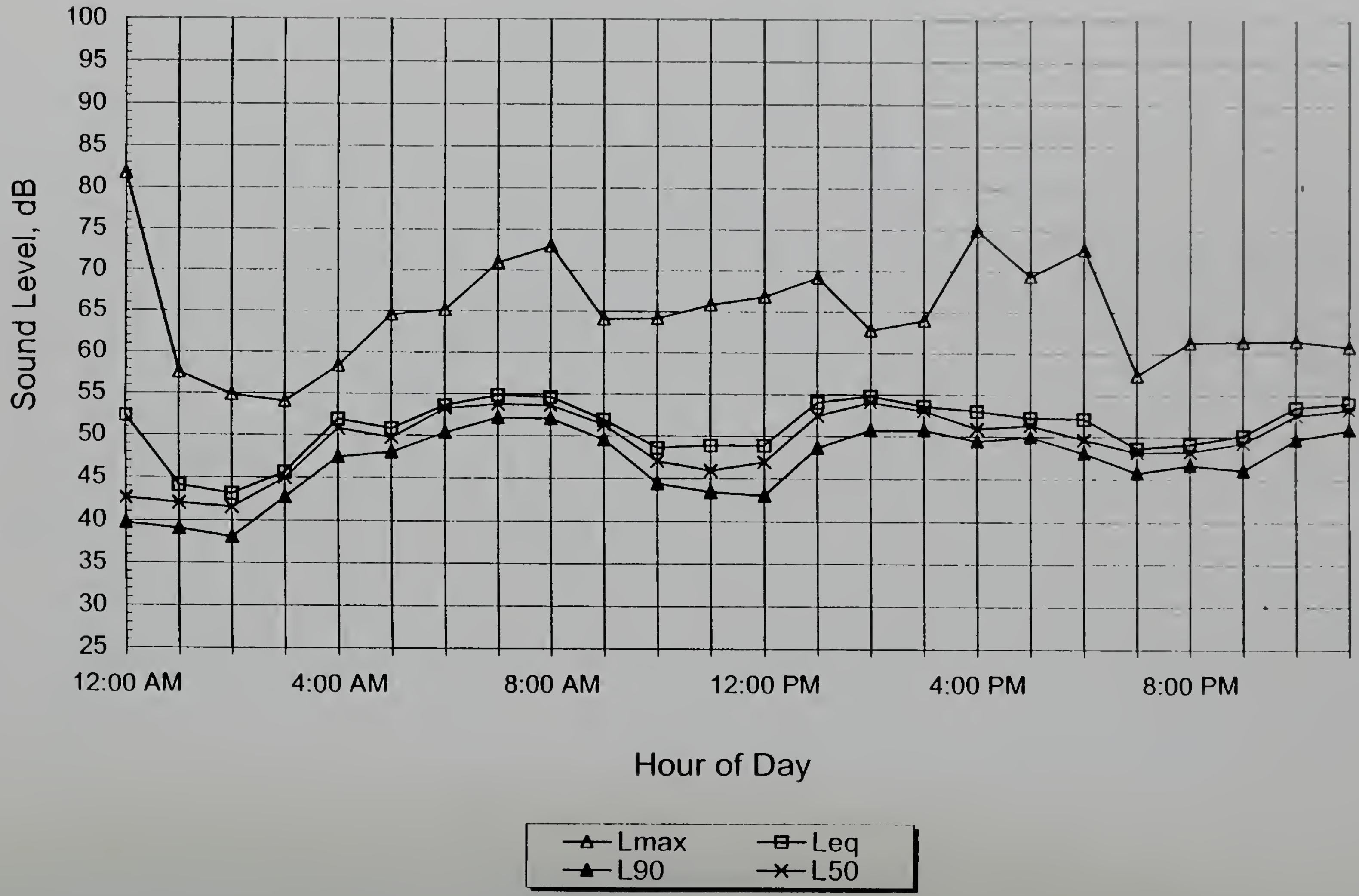
December 20, 1999



Measured Hourly Noise Levels

Site 1: 505 Paloma Way- Sunol, CA

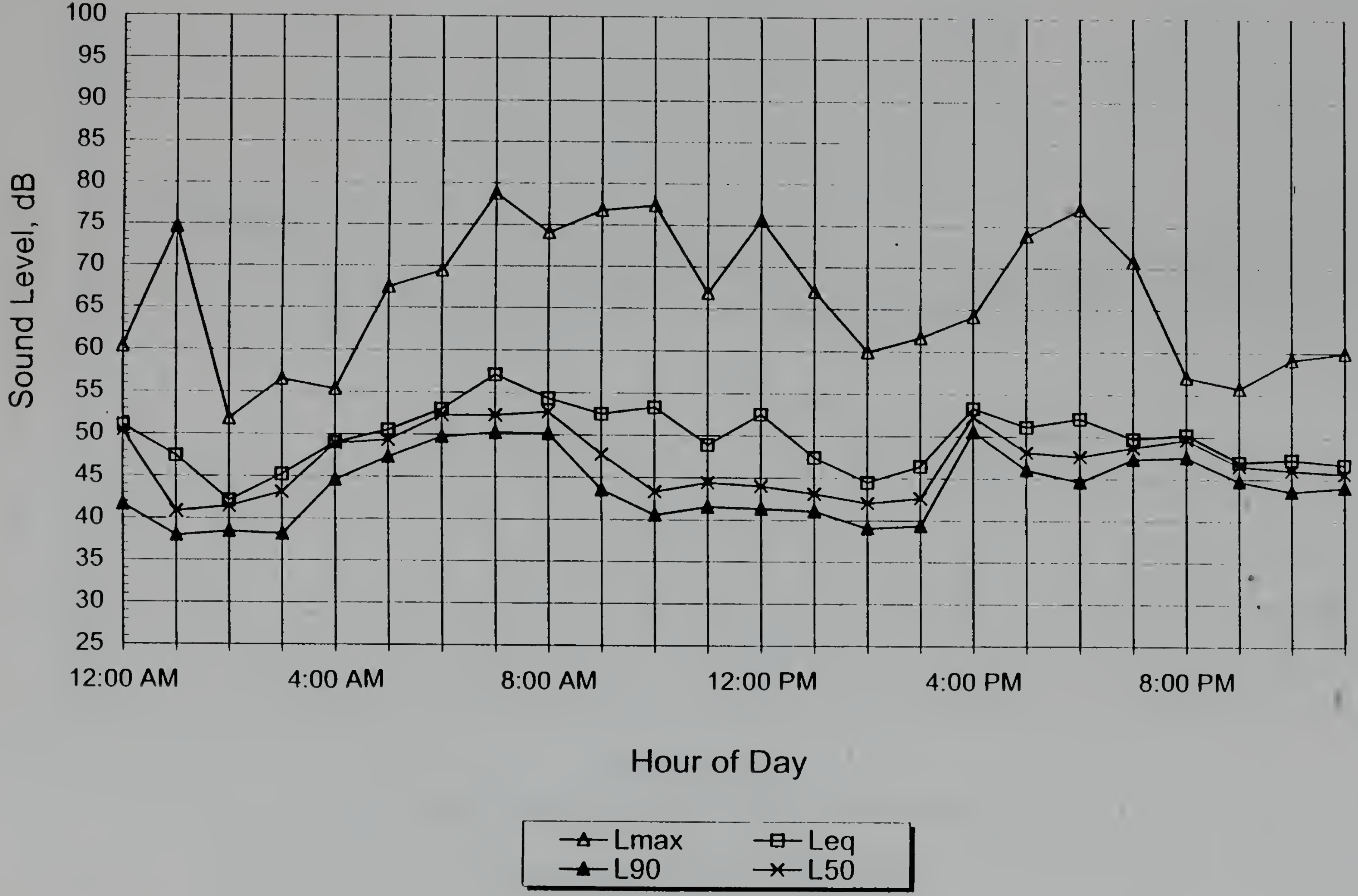
December 21, 1999



Measured Hourly Noise Levels

Site 1: 505 Paloma Way- Sunol, CA

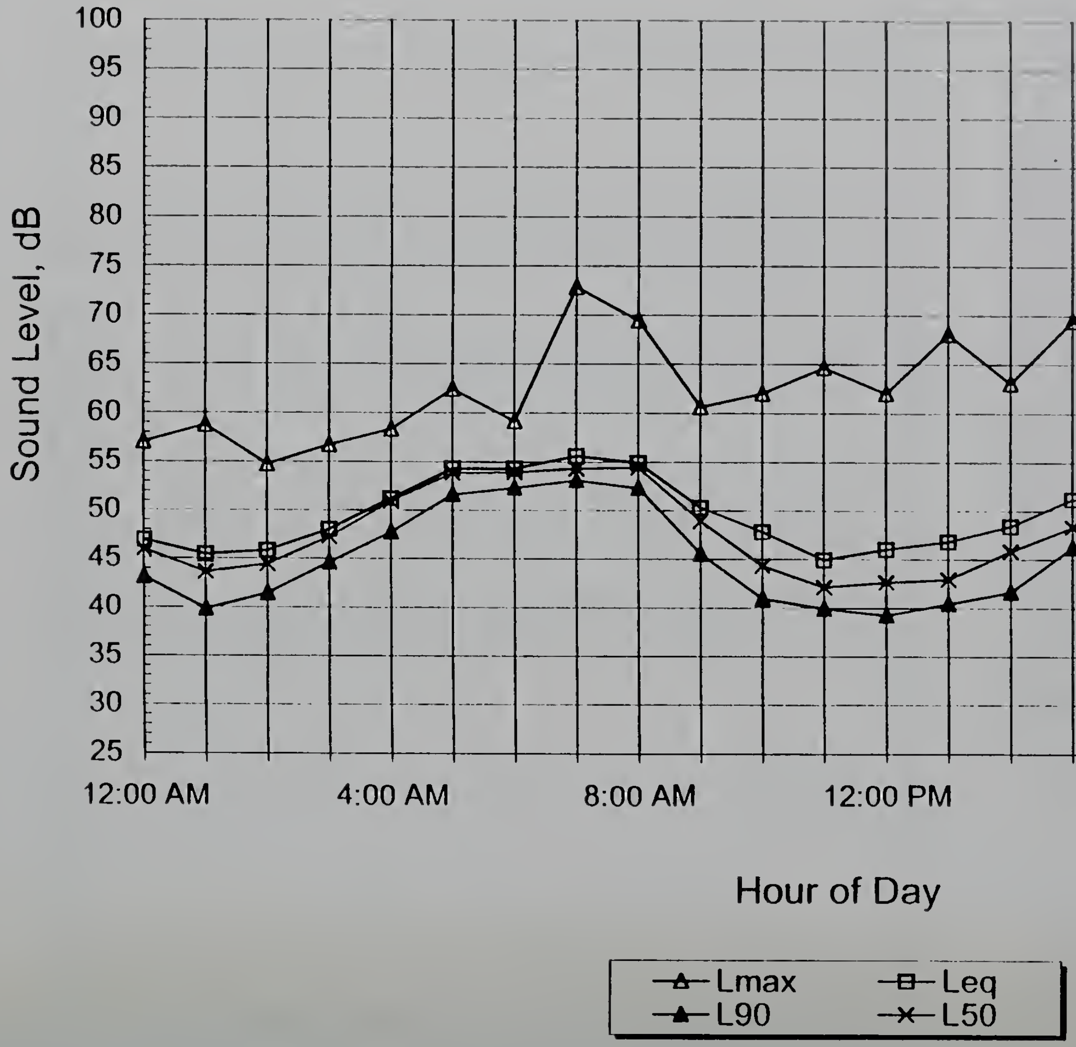
December 22, 1999



Measured Hourly Noise Levels

Site 1: 505 Paloma Way- Sunol, CA

December 23, 1999



Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 1: 505 Paloma Way- Sunol, CA

December 17, 1999

Hour	Leq	Lmax	L50	L90
0:00	47.6	65.2	46.0	43.8
1:00	46.7	56.9	45.7	42.8
2:00	46.5	54.6	45.8	42.6
3:00	50.2	71.5	48.6	45.2
4:00	52.6	60.3	52.4	50.2
5:00	53.0	65.3	52.7	51.5
6:00	53.1	59.7	52.6	51.2
7:00	55.7	75.2	52.7	51.4
8:00	56.4	74.3	55.7	53.4
9:00	50.6	67.3	49.2	47.0
10:00	49.7	68.7	46.2	44.6
11:00	49.4	73.8	46.2	44.2
12:00	46.1	58.7	44.0	41.9
13:00	48.3	65.9	45.9	43.2
14:00:00	48.3	65.8	46.3	43.5
15:00:00	49.0	64.3	46.8	44.1
16:00:00	51.8	65.1	50.4	46.6
17:00:00	52.0	72.3	50.3	48.3
18:00:00	50.6	72.3	47.7	45.6
19:00:00	50.3	63.5	49.2	46.9
20:00:00	47.1	56.5	45.9	44.1
21:00:00	49.9	65.9	47.5	45.3
22:00:00	49.9	58.8	49.3	45.7
23:00:00	46.1	52.6	45.8	44.2

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	56.4	46.1	51.3	50.4	51.0
Lmax	75.2	52.6	70.0	64.4	68.7
L50	55.7	44.0	49.5	49.8	49.6
L90	53.4	41.9	46.0	46.4	46.1

Ldn	56.9
CNEL	57.1

Brown Buntin Associates Inc.
Measured Hourly Noise Levels
Site 1: 505 Paloma Way- Sunol, CA
December 18, 1999

Hour	Leq	Lmax	L50	L90
0:00	46.3	57.0	45.6	44.0
1:00	45.5	53.4	45.0	42.9
2:00	44.7	56.6	43.8	41.0
3:00	44.4	53.1	43.8	41.3
4:00	47.5	60.4	46.6	42.9
5:00	50.9	63.6	50.2	46.4
6:00	50.9	58.1	50.4	47.8
7:00	53.0	59.0	52.6	51.0
8:00	55.2	63.0	54.7	52.6
9:00	53.4	65.4	52.4	47.9
10:00	41.3	51.7	39.9	38.1
11:00	50.5	78.3	40.6	38.6
12:00	48.1	73.8	41.5	39.7
13:00	46.5	63.6	43.4	41.2
14:00:00	47.5	67.9	40.9	38.9
15:00:00	47.7	62.6	45.2	40.6
16:00:00	49.8	72.2	46.5	44.3
17:00:00	52.2	65.6	51.7	50.0
18:00:00	53.0	63.9	52.5	51.1
19:00:00	51.1	56.7	51.0	49.3
20:00:00	49.6	61.7	49.2	47.9
21:00:00	49.0	57.2	48.6	47.2
22:00:00	48.6	54.8	48.4	47.0
23:00:00	50.5	56.5	50.2	48.2

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	55.2	41.3	50.9	48.4	50.1
Lmax	78.3	51.7	69.5	58.4	67.6
L50	54.7	39.9	49.7	47.9	49.1
L90	52.6	38.1	45.2	44.6	45.0

Ldn	55.3
CNEL	55.6

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 1: 505 Paloma Way- Sunol, CA

December 19, 1999

Hour	Leq	Lmax	L50	L90
0:00	47.4	56.0	47.0	45.3
1:00	45.9	57.7	45.3	42.1
2:00	43.8	55.0	43.3	41.0
3:00	41.7	50.2	41.0	38.3
4:00	42.6	51.9	41.7	39.2
5:00	47.5	71.4	44.0	41.8
6:00	44.0	53.4	43.5	41.4
7:00	45.5	58.6	44.0	42.0
8:00	46.1	58.8	44.6	41.7
9:00	47.9	58.3	46.8	44.5
10:00	53.9	65.0	52.7	47.7
11:00	54.8	64.1	53.7	49.7
12:00	55.1	65.3	54.2	51.2
13:00	54.4	64.0	53.5	50.2
14:00:00	57.1	66.6	56.3	52.1
15:00:00	52.8	66.4	51.9	49.2
16:00:00	51.3	63.0	50.6	48.9
17:00:00	51.3	65.4	50.1	48.7
18:00:00	50.3	63.3	49.6	48.2
19:00:00	49.0	62.8	48.2	46.6
20:00:00	49.1	59.2	48.6	47.1
21:00:00	49.0	56.3	48.5	47.1
22:00:00	47.4	59.8	46.5	44.5
23:00:00	52.4	63.1	48.7	42.2

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	57.1	41.7	52.4	47.1	51.1
Lmax	71.4	50.2	63.5	63.1	63.4
L50	56.3	41.0	51.5	45.2	50.0
L90	52.1	38.3	47.7	41.8	45.4

Ldn	54.8
CNEL	55.1

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 1: 505 Paloma Way- Sunol, CA

December 20, 1999

Hour	Leq	Lmax	L50	L90
0:00	53.3	63.6	50.4	47.1
1:00	46.6	54.1	45.8	43.4
2:00	44.1	52.1	43.5	40.5
3:00	44.6	53.5	44.0	40.5
4:00	50.1	55.6	49.8	47.2
5:00	51.3	64.6	50.8	48.7
6:00	50.7	70.0	49.7	48.2
7:00	53.3	62.7	52.8	51.1
8:00	54.3	75.5	52.3	50.3
9:00	53.0	73.6	51.1	49.3
10:00	55.9	66.0	54.5	51.7
11:00	57.7	65.3	56.7	53.4
12:00	57.4	64.8	56.4	53.2
13:00	54.4	67.1	52.9	49.9
14:00:00	53.8	62.6	53.0	49.7
15:00:00	52.2	59.9	51.7	49.4
16:00:00	52.1	61.0	51.7	50.2
17:00:00	53.7	72.5	52.3	50.9
18:00:00	52.8	76.5	51.4	49.1
19:00:00	50.6	64.0	49.9	48.2
20:00:00	50.7	58.1	50.2	48.2
21:00:00	51.6	74.3	48.6	46.2
22:00:00	47.8	61.4	46.7	44.2
23:00:00	47.3	58.7	46.2	42.7

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	57.7	44.1	54.1	49.4	52.9
Lmax	76.5	52.1	70.6	63.1	69.0
L50	56.7	43.5	52.9	48.2	51.7
L90	53.4	40.5	50.1	44.7	48.1

Ldn	56.9
CNEL	57.1

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 1: 505 Paloma Way- Sunol, CA

December 21, 1999

Hour	Leq	Lmax	L50	L90
0:00	52.3	81.7	42.6	39.7
1:00	44.1	57.5	42.0	39.0
2:00	43.1	54.8	41.5	38.0
3:00	45.6	54.0	44.9	42.7
4:00	51.9	58.3	50.8	47.4
5:00	50.8	64.5	49.7	48.0
6:00	53.6	65.1	53.2	50.3
7:00	54.8	70.9	53.7	52.1
8:00	54.6	72.9	53.6	52.0
9:00	51.9	64.0	51.3	49.5
10:00	48.6	64.1	47.0	44.4
11:00	48.9	65.8	45.9	43.4
12:00	48.9	66.8	46.9	43.0
13:00	54.0	69.1	52.4	48.6
14:00:00	54.8	62.7	54.0	50.7
15:00:00	53.6	63.9	53.0	50.7
16:00:00	53.0	74.9	50.9	49.4
17:00:00	52.2	69.3	51.3	49.9
18:00:00	52.1	72.6	49.6	48.0
19:00:00	48.6	57.3	48.1	45.7
20:00:00	49.1	61.3	48.2	46.6
21:00:00	50.1	61.4	49.2	46.0
22:00:00	53.5	61.5	52.5	49.6
23:00:00	54.0	60.8	53.2	50.8

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	**54.8**	**43.1**	**52.3**	**51.4**	**52.0**
Lmax	**81.7**	**54.0**	**69.0**	**72.5**	**70.6**
L50	**54.0**	**41.5**	**51.1**	**49.9**	**50.7**
L90	**52.1**	**38.0**	**48.0**	**45.1**	**46.9**

Ldn	**57.9**
CNEL	**58.1**

Brown Buntin Associates Inc.
Measured Hourly Noise Levels
Site 1: 505 Paloma Way- Sunol, CA
December 22, 1999

Hour	Leq	Lmax	L50	L90
0:00	51.0	60.3	50.3	41.6
1:00	47.4	74.6	40.8	37.9
2:00	42.1	51.8	41.4	38.4
3:00	45.2	56.5	43.1	38.1
4:00	49.0	55.3	48.9	44.6
5:00	50.5	67.4	49.3	47.3
6:00	53.0	69.4	52.3	49.7
7:00	57.1	78.7	52.3	50.2
8:00	54.3	74.0	52.7	50.1
9:00	52.5	76.7	47.7	43.5
10:00	53.3	77.3	43.3	40.5
11:00	48.9	66.8	44.4	41.5
12:00	52.5	75.6	44.0	41.3
13:00	47.4	67.0	43.1	41.0
14:00:00	44.5	59.9	42.0	39.0
15:00:00	46.4	61.6	42.6	39.3
16:00:00	53.3	64.1	52.3	50.5
17:00:00	51.1	73.8	48.1	46.0
18:00:00	52.1	77.0	47.6	44.6
19:00:00	49.7	70.7	48.7	47.3
20:00:00	50.2	57.0	49.6	47.5
21:00:00	47.0	55.7	46.5	44.7
22:00:00	47.3	59.1	46.0	43.5
23:00:00	46.7	59.9	45.6	44.0

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	57.1	42.1	51.9	49.0	51.0
Lmax	78.7	51.8	73.5	67.2	72.0
L50	52.7	40.8	48.4	48.0	48.3
L90	50.5	37.9	44.5	42.8	43.8

Ldn	56.0
CNEL	56.2

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 1: 505 Paloma Way- Sunol, CA

December 23, 1999

Hour	Leq	Lmax	L50	L90
0:00	46.9	57.0	45.9	43.1
1:00	45.4	58.7	43.6	39.8
2:00	45.8	54.7	44.4	41.4
3:00	48.0	56.7	47.2	44.6
4:00	51.2	58.3	50.9	47.7
5:00	54.3	62.4	53.8	51.6
6:00	54.3	59.1	53.9	52.3
7:00	55.6	72.8	54.3	53.1
8:00	54.9	69.4	54.4	52.3
9:00	50.3	60.6	48.9	45.5
10:00	47.8	62.0	44.3	40.9
11:00	44.9	64.6	42.1	39.9
12:00	46.0	62.0	42.6	39.2
13:00	46.8	68.0	42.9	40.4
14:00:00	48.4	63.0	45.8	41.6
15:00:00	51.2	69.4	48.3	46.2
16:00:00	51.2	66.4	49.1	45.3
17:00:00	52.6	71.6	49.2	47.3
18:00:00	52.6	77.2	48.0	45.4
19:00:00	48.7	57.4	48.1	46.1
20:00:00	47.8	55.7	47.2	45.4
21:00:00	50.1	69.0	48.0	45.4
22:00:00	47.5	65.5	46.7	44.6
23:00:00	45.3	51.6	44.9	43.2

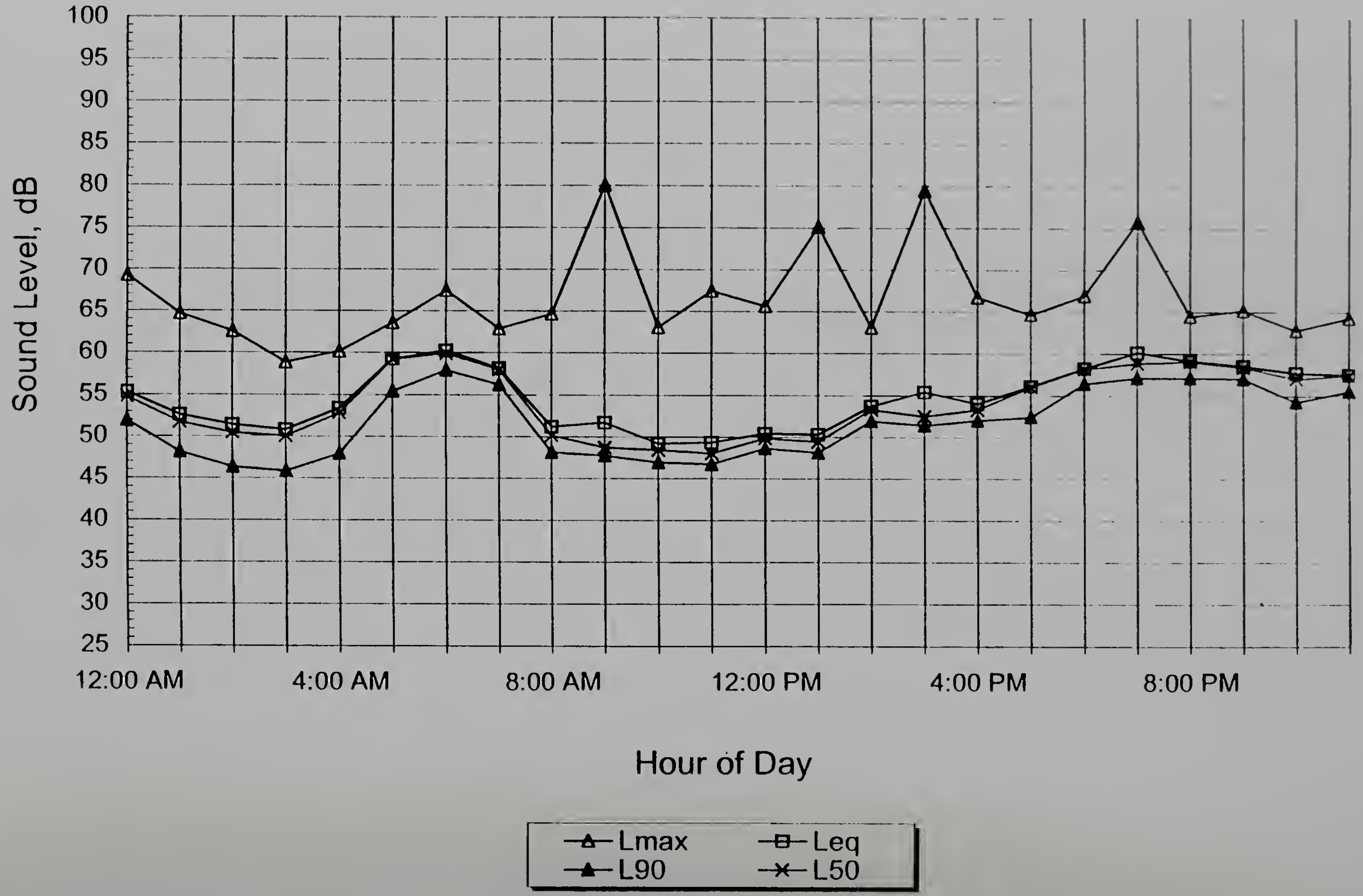
Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	55.6	44.9	51.0	50.2	50.7
Lmax	77.2	51.6	69.4	60.0	67.7
L50	54.4	42.1	49.1	49.6	49.3
L90	53.1	39.2	44.9	45.4	45.1

Ldn	56.7
CNEL	56.9

Measured Hourly Noise Levels

Site 2: 1567 Belleville Way- Sunnyvale, CA

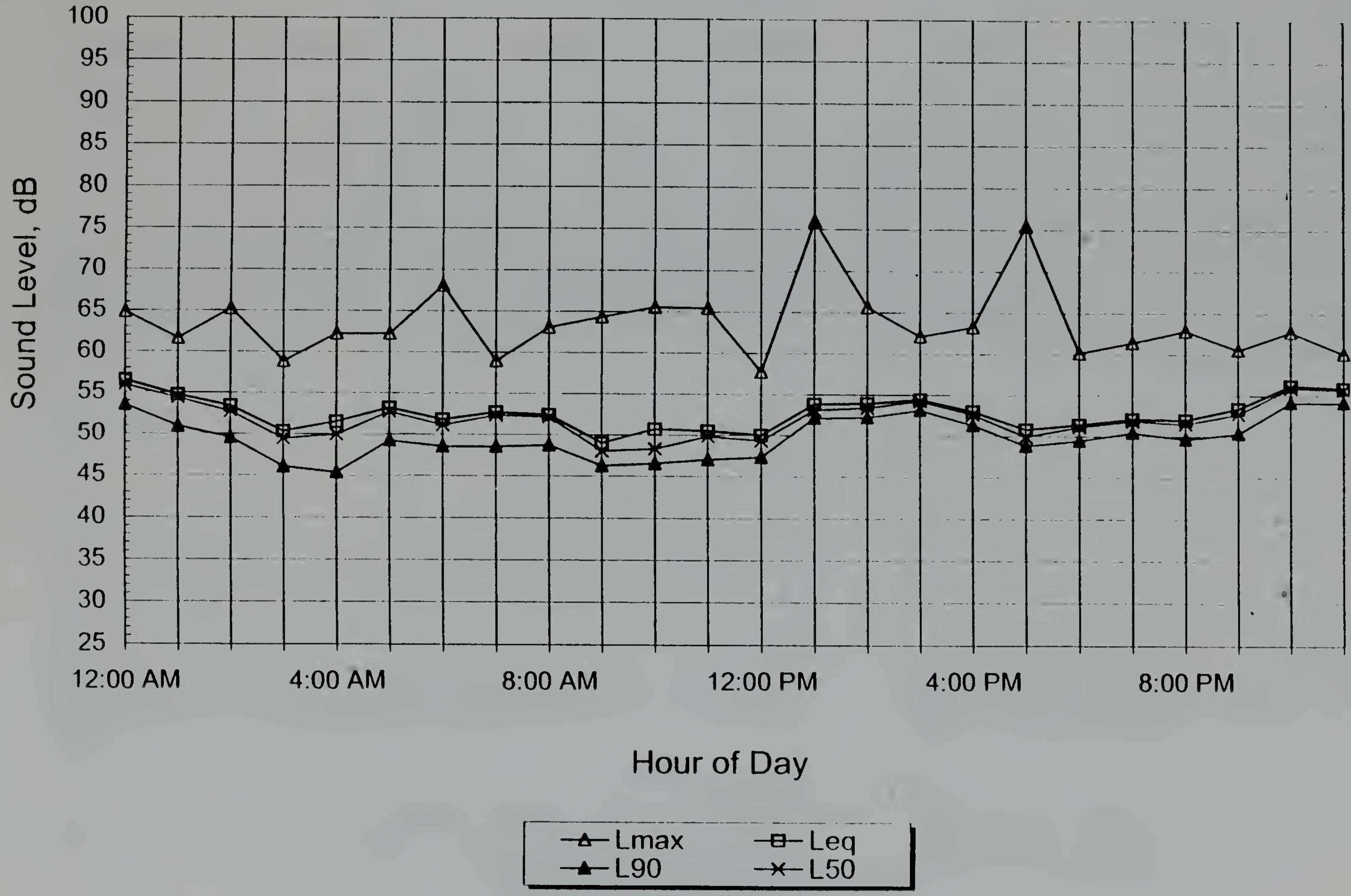
December 17, 1999



Measured Hourly Noise Levels

Site 2: 1567 Belleville Way- Sunnyvale, CA

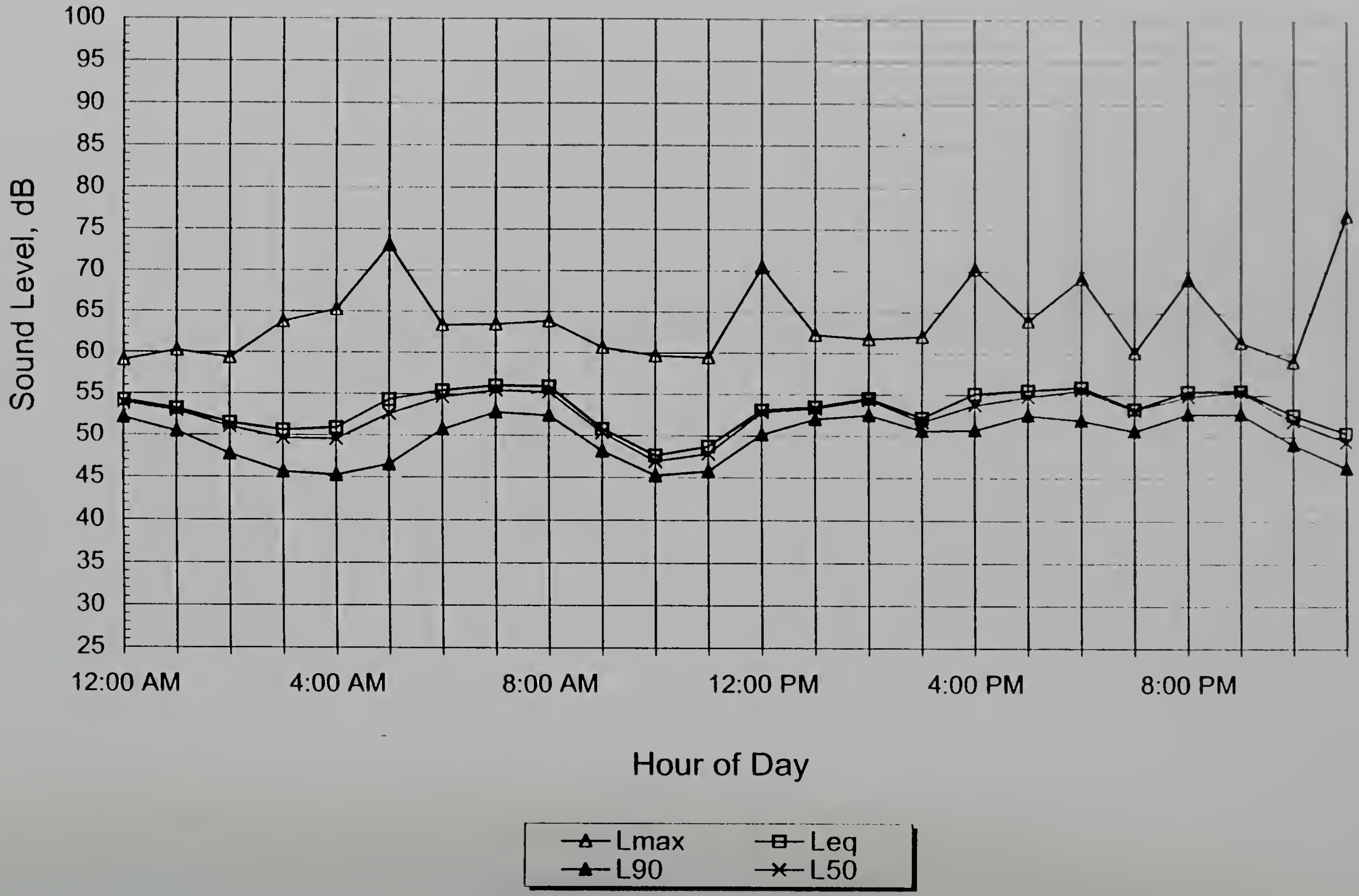
December 18, 1999



Measured Hourly Noise Levels

Site 2: 1567 Belleville Way- Sunnyvale, CA

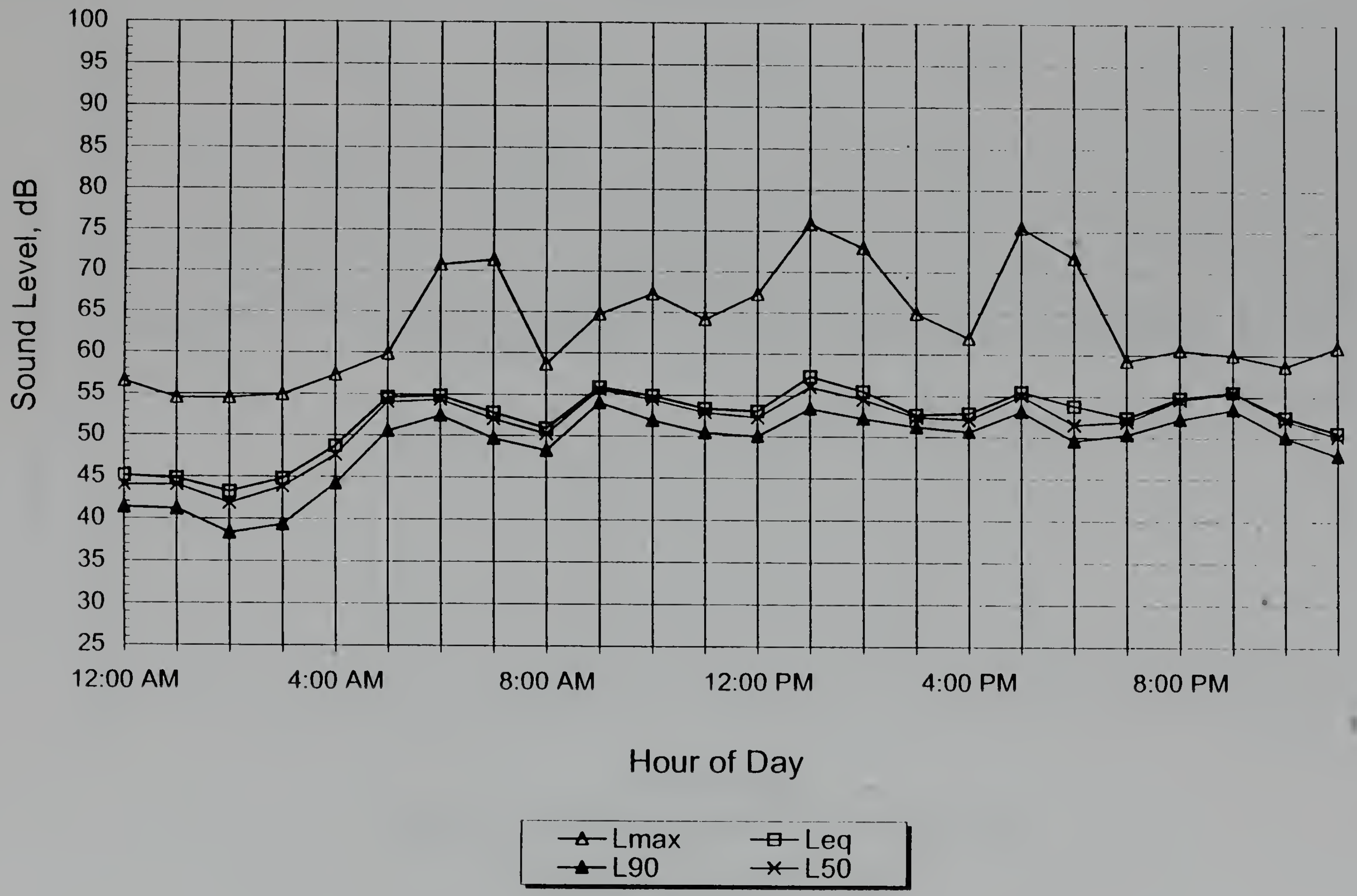
December 19, 1999



Measured Hourly Noise Levels

Site 2: 1567 Belleville Way- Sunnyvale, CA

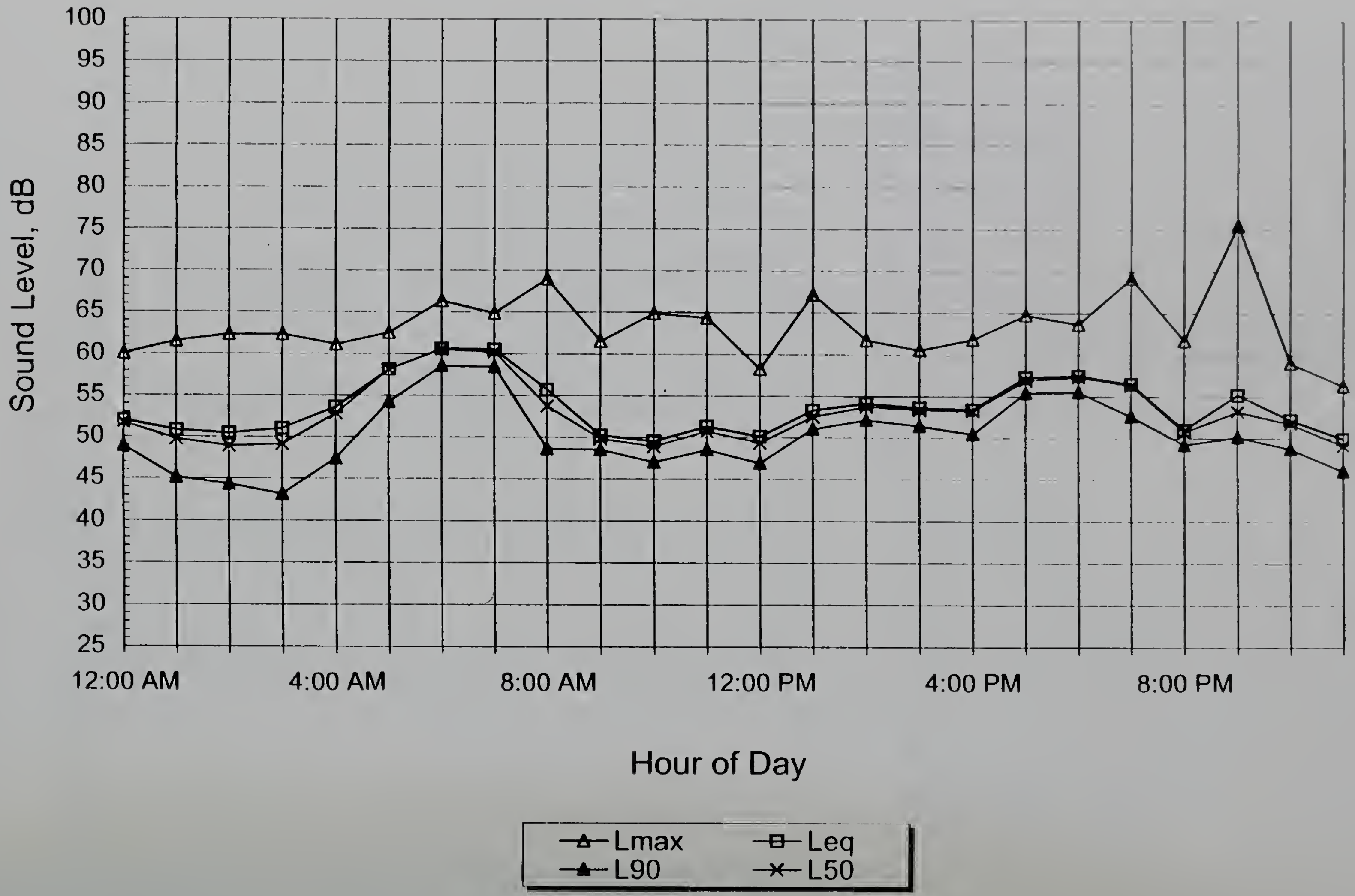
December 20, 1999



Measured Hourly Noise Levels

Site 2: 1567 Belleville Way- Sunnyvale, CA

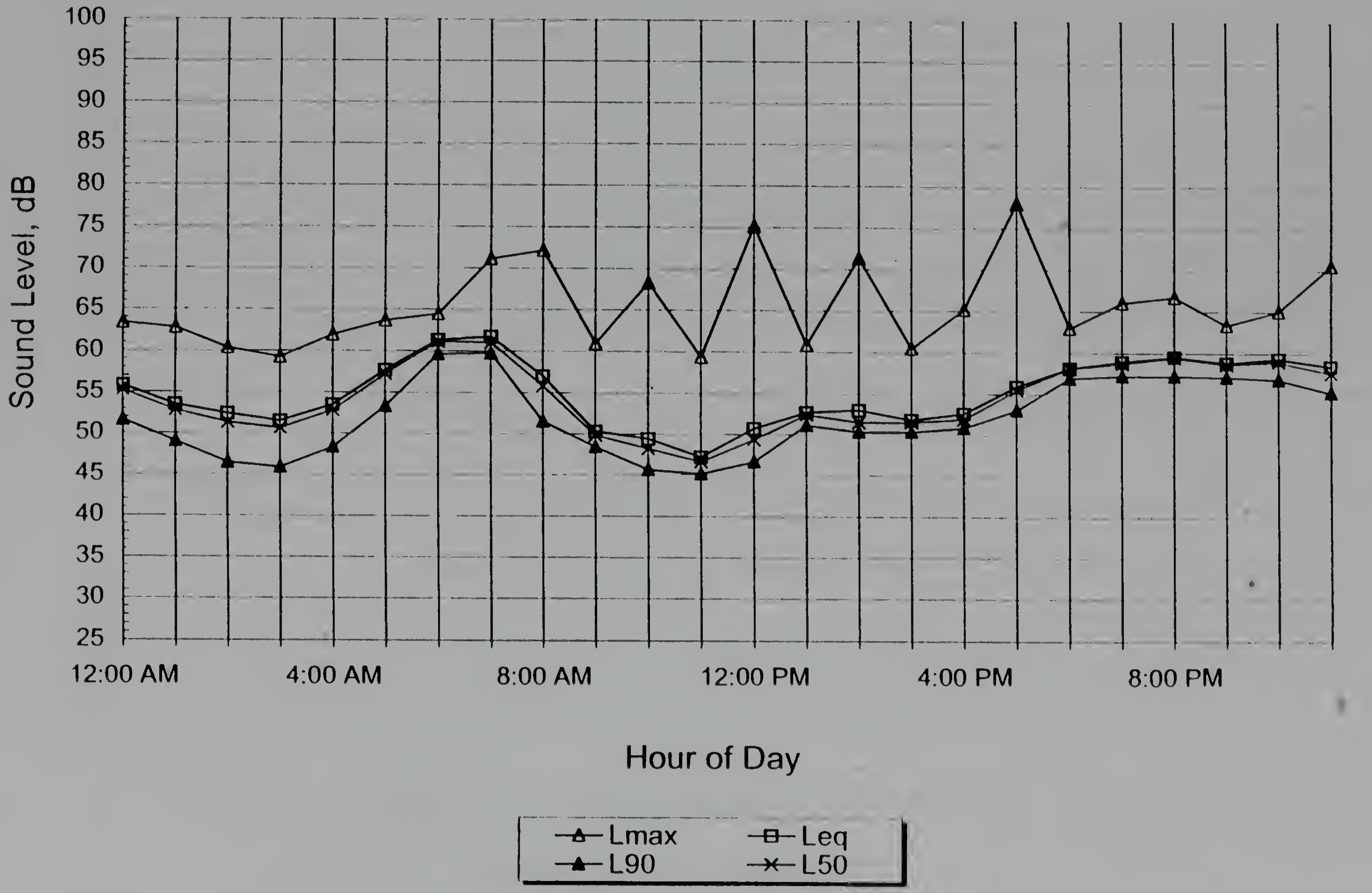
December 21, 1999



Measured Hourly Noise Levels

Site 2: 1567 Belleville Way- Sunnyvale, CA

December 23, 1999



Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 2: 1567 Belleville Way- Sunnyvale. CA

December 17. 1999

Hour	Leq	Lmax	L50	L90
0:00	55.3	69.2	54.7	51.9
1:00	52.6	64.6	51.7	48.1
2:00	51.4	62.5	50.4	46.3
3:00	50.8	58.8	50.0	45.8
4:00	53.4	60.1	52.8	47.9
5:00	59.2	63.5	59.2	55.4
6:00	60.2	67.4	59.8	57.9
7:00	58.1	62.8	58.0	56.2
8:00	51.2	64.6	50.1	48.1
9:00	51.7	80.0	48.7	47.7
10:00	49.2	63.0	48.4	46.9
11:00	49.3	67.4	48.0	46.7
12:00	50.4	65.6	49.8	48.6
13:00	50.3	75.1	49.4	48.1
14:00:00	53.7	63.0	53.3	51.9
15:00:00	55.4	79.4	52.5	51.4
16:00:00	54.0	66.7	53.3	52.0
17:00:00	56.1	64.6	56.0	52.4
18:00:00	58.2	66.9	58.1	56.4
19:00:00	60.1	75.7	58.8	57.1
20:00:00	59.1	64.4	59.0	57.1
21:00:00	58.5	65.1	58.3	57.0
22:00:00	57.7	62.7	57.0	54.2
23:00:00	57.5	64.2	57.4	55.5

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	60.2	49.2	55.8	56.5	56.1
Lmax	80.0	58.8	72.9	64.8	71.2
L50	59.8	48.0	55.2	56.1	55.6
L90	57.9	45.8	51.8	51.4	51.7

Ldn	62.8
CNEL	63.3

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 2: 1567 Belleville Way- Sunnyvale, CA

December 18, 1999

Hour	Leq	Lmax	L50	L90
0:00	56.5	64.8	55.9	53.5
1:00	54.7	61.6	54.3	50.9
2:00	53.4	65.2	52.7	49.5
3:00	50.3	58.8	49.4	46.0
4:00	51.5	62.2	49.9	45.3
5:00	53.2	62.2	52.7	49.2
6:00	51.8	68.0	51.1	48.5
7:00	52.7	58.9	52.3	48.5
8:00	52.4	63.0	52.1	48.7
9:00	49.0	64.3	48.0	46.2
10:00	50.7	65.5	48.3	46.5
11:00	50.5	65.4	49.8	47.0
12:00	50.0	57.7	49.3	47.3
13:00	53.8	75.9	53.1	52.1
14:00:00	53.9	65.6	53.4	52.2
15:00:00	54.4	62.1	54.2	53.1
16:00:00	53.0	63.2	52.6	51.3
17:00:00	50.8	75.4	49.9	48.8
18:00:00	51.4	60.1	51.1	49.4
19:00:00	52.1	61.4	51.8	50.4
20:00:00	52.0	62.8	51.5	49.6
21:00:00	53.4	60.5	52.7	50.3
22:00:00	56.2	62.7	55.9	54.1
23:00:00	55.9	60.1	55.7	54.1

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	56.5	49.0	52.3	54.2	53.1
Lmax	75.9	57.7	68.2	63.7	67.0
L50	55.9	48.0	51.7	53.7	52.6
L90	54.1	45.3	49.4	50.1	49.7

Ldn	60.4
CNEL	60.6

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 2: 1567 Belleville Way- Sunnyvale, CA

December 19, 1999

Hour	Leq	Lmax	L50	L90
0:00	54.2	59.0	53.9	52.1
1:00	53.2	60.2	52.9	50.4
2:00	51.5	59.3	51.0	47.7
3:00	50.6	63.7	49.6	45.6
4:00	50.9	65.2	49.5	45.2
5:00	54.3	73.0	52.6	46.5
6:00	55.4	63.3	54.6	50.7
7:00	56.0	63.4	55.4	52.8
8:00	55.9	63.8	55.2	52.4
9:00	50.8	60.6	50.3	48.1
10:00	47.6	59.6	46.9	45.2
11:00	48.7	59.4	47.8	45.7
12:00	53.1	70.4	52.8	50.1
13:00	53.5	62.2	53.3	52.0
14:00:00	54.5	61.7	54.3	52.5
15:00:00	52.2	62.0	51.7	50.6
16:00:00	55.1	70.2	53.7	50.7
17:00:00	55.5	63.9	54.7	52.5
18:00:00	55.9	69.1	55.5	51.9
19:00:00	53.3	60.1	53.1	50.6
20:00:00	55.4	69.0	54.8	52.7
21:00:00	55.5	61.4	55.3	52.7
22:00:00	52.6	59.0	51.8	49.0
23:00:00	50.4	76.7	49.3	46.2

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	56.0	47.6	54.1	52.9	53.7
Lmax	76.7	59.0	65.6	69.4	67.4
L50	55.5	46.9	53.6	52.1	53.1
L90	52.8	45.2	50.7	48.2	49.7

Ldn	59.5
CNEL	59.9

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 2: 1567 Belleville Way- Sunnyvale, CA

December 20. 1999

Hour	Leq	Lmax	L50	L90
0:00	45.1	56.5	44.0	41.3
1:00	44.8	54.5	44.0	41.1
2:00	43.2	54.5	41.8	38.3
3:00	44.8	54.9	43.8	39.3
4:00	48.7	57.3	47.6	44.2
5:00	54.6	59.8	54.0	50.5
6:00	54.8	70.7	54.3	52.4
7:00	52.8	71.3	52.0	49.6
8:00	50.9	58.6	50.2	48.2
9:00	55.9	64.7	55.6	54.0
10:00	54.9	67.2	54.4	51.9
11:00	53.4	64.1	52.9	50.4
12:00	53.1	67.2	52.3	50.0
13:00	57.3	75.8	56.0	53.4
14:00:00	55.5	72.9	54.5	52.2
15:00:00	52.7	64.9	52.4	51.2
16:00:00	52.9	61.9	52.1	50.6
17:00:00	55.5	75.4	55.0	53.1
18:00:00	53.8	71.7	51.5	49.5
19:00:00	52.4	59.2	51.9	50.3
20:00:00	54.8	60.5	54.5	52.2
21:00:00	55.5	59.9	55.4	53.4
22:00:00	52.5	58.6	52.1	50.0
23:00:00	50.6	60.9	50.1	47.8

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	57.3	43.2	54.4	50.8	53.4
Lmax	75.8	54.5	69.8	62.6	68.3
L50	56.0	41.8	53.7	50.2	52.7
L90	54.0	38.3	51.3	45.0	49.0

Ldn	57.9
CNEL	58.4

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 2: 1567 Belleville Way- Sunnyvale, CA

December 21, 1999

Hour	Leq	Lmax	L50	L90
0:00	52.0	60.0	51.7	48.9
1:00	50.8	61.5	49.7	45.1
2:00	50.4	62.3	48.9	44.3
3:00	51.0	62.3	49.1	43.1
4:00	53.6	61.1	52.8	47.4
5:00	58.1	62.5	58.1	54.2
6:00	60.6	66.3	60.5	58.5
7:00	60.5	64.8	60.2	58.4
8:00	55.7	68.9	53.7	48.6
9:00	50.2	61.5	49.8	48.5
10:00	49.5	64.8	48.9	47.0
11:00	51.3	64.3	50.7	48.5
12:00	50.1	58.2	49.3	46.9
13:00	53.3	67.1	52.5	51.0
14:00:00	54.1	61.7	53.7	52.1
15:00:00	53.6	60.5	53.3	51.4
16:00:00	53.4	61.8	53.2	50.4
17:00:00	57.3	64.7	56.9	55.4
18:00:00	57.5	63.6	57.3	55.5
19:00:00	56.5	69.1	56.3	52.6
20:00:00	51.0	61.7	50.7	49.2
21:00:00	55.2	75.5	53.2	50.1
22:00:00	52.2	59.0	51.7	48.7
23:00:00	49.9	56.3	49.1	46.0

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	60.6	49.5	55.1	54.9	55.0
Lmax	75.5	56.3	67.2	62.0	65.9
L50	60.5	48.9	54.5	54.6	54.6
L90	58.5	43.1	51.0	48.5	50.1

Ldn	61.4
CNEL	61.6

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 2: 1567 Belleville Way- Sunnyvale, CA

December 22, 1999

Hour	Leq	Lmax	L50	L90
0:00	45.3	55.2	44.3	41.6
1:00	41.4	54.2	40.6	38.3
2:00	43.1	53.5	41.6	37.9
3:00	45.5	56.3	44.2	39.6
4:00	49.6	57.3	48.8	45.1
5:00	57.9	66.7	57.4	52.6
6:00	60.1	70.2	59.7	57.8
7:00	61.2	78.5	59.3	57.5
8:00	65.1	83.0	53.7	49.7
9:00	54.2	70.0	50.6	47.8
10:00	49.1	65.1	48.2	46.5
11:00	49.2	69.7	47.4	45.4
12:00	55.5	68.2	50.0	47.4
13:00	53.6	67.2	51.5	50.5
14:00:00	52.5	67.1	51.4	50.3
15:00:00	51.9	65.0	51.3	50.2
16:00:00	54.1	79.9	52.3	50.3
17:00:00	55.7	59.4	55.6	54.0
18:00:00	58.2	64.0	58.0	56.4
19:00:00	59.8	64.6	59.7	57.9
20:00:00	60.1	64.7	59.9	58.0
21:00:00	59.2	67.3	58.9	57.1
22:00:00	58.7	63.3	58.6	56.9
23:00:00	56.6	62.2	56.1	53.8

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	65.1	41.4	58.2	55.3	57.3
Lmax	83.0	53.5	74.5	63.6	72.7
L50	59.9	40.6	55.8	54.9	55.5
L90	58.0	37.9	51.9	47.1	50.1

Ldn	62.3
CNEL	62.8

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 2: 1567 Belleville Way- Sunnyvale, CA

December 23, 1999

Hour	Leq	Lmax	L50	L90
0:00	55.8	63.3	55.2	51.6
1:00	53.5	62.7	52.8	49.0
2:00	52.4	60.3	51.3	46.4
3:00	51.5	59.2	50.6	45.8
4:00	53.5	61.9	52.8	48.3
5:00	57.7	63.6	57.2	53.3
6:00	61.3	64.4	61.1	59.6
7:00	61.7	71.1	61.0	59.7
8:00	57.0	72.1	55.8	51.5
9:00	50.3	60.9	49.8	48.4
10:00	49.4	68.2	48.2	45.6
11:00	47.2	59.3	46.6	45.1
12:00	50.7	75.1	49.3	46.6
13:00	52.7	60.8	52.4	51.1
14:00:00	53.0	71.3	51.5	50.3
15:00:00	51.8	60.4	51.5	50.3
16:00:00	52.6	65.1	51.9	50.8
17:00:00	55.9	77.9	55.4	53.0
18:00:00	58.1	62.9	58.1	56.9
19:00:00	58.9	66.0	58.7	57.2
20:00:00	59.5	66.7	59.4	57.2
21:00:00	58.8	63.3	58.6	57.1
22:00:00	59.3	65.0	58.9	56.8
23:00:00	58.4	70.5	57.6	55.2

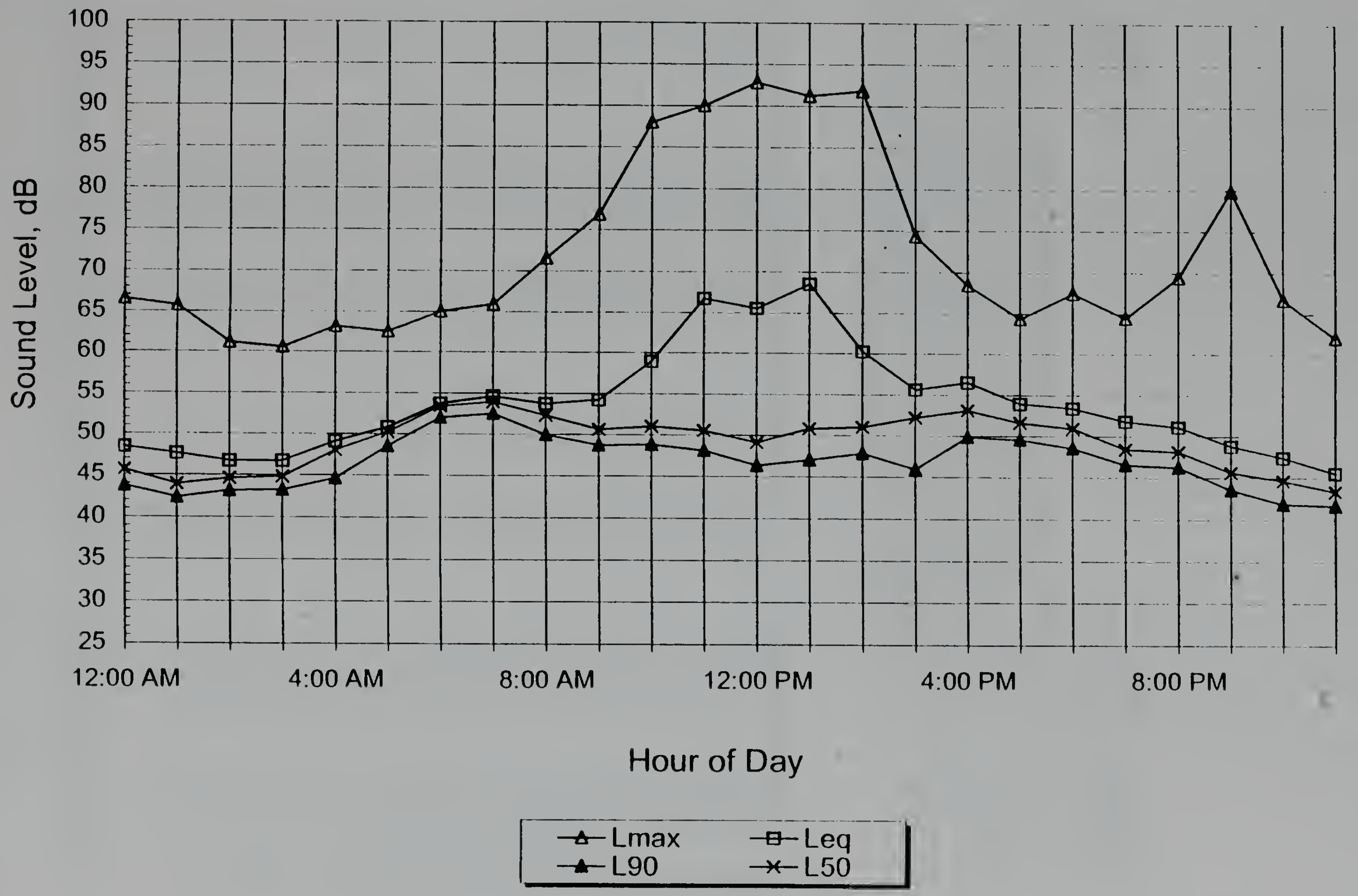
Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	61.7	47.2	56.4	57.1	56.7
Lmax	77.9	59.2	70.4	64.8	69.0
L50	61.1	46.6	55.9	56.6	56.2
L90	59.7	45.1	52.1	51.8	52.0

Ldn	63.4
CNEL	63.8

Measured Hourly Noise Levels

Site 3: 37084 Laurel Street- Newark, CA

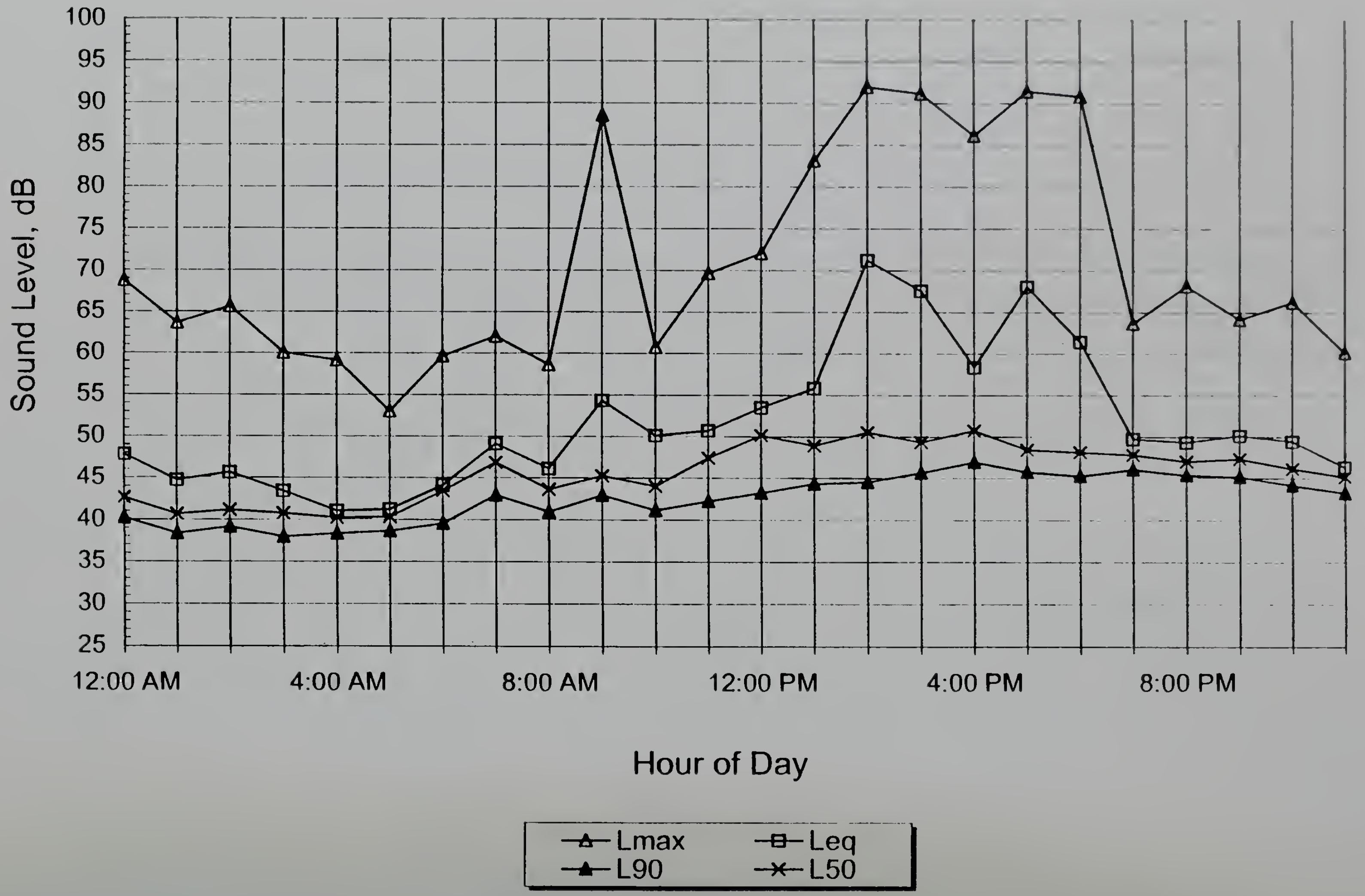
December 17, 1999



Measured Hourly Noise Levels

Site 3: 37084 Laurel Street- Newark, CA

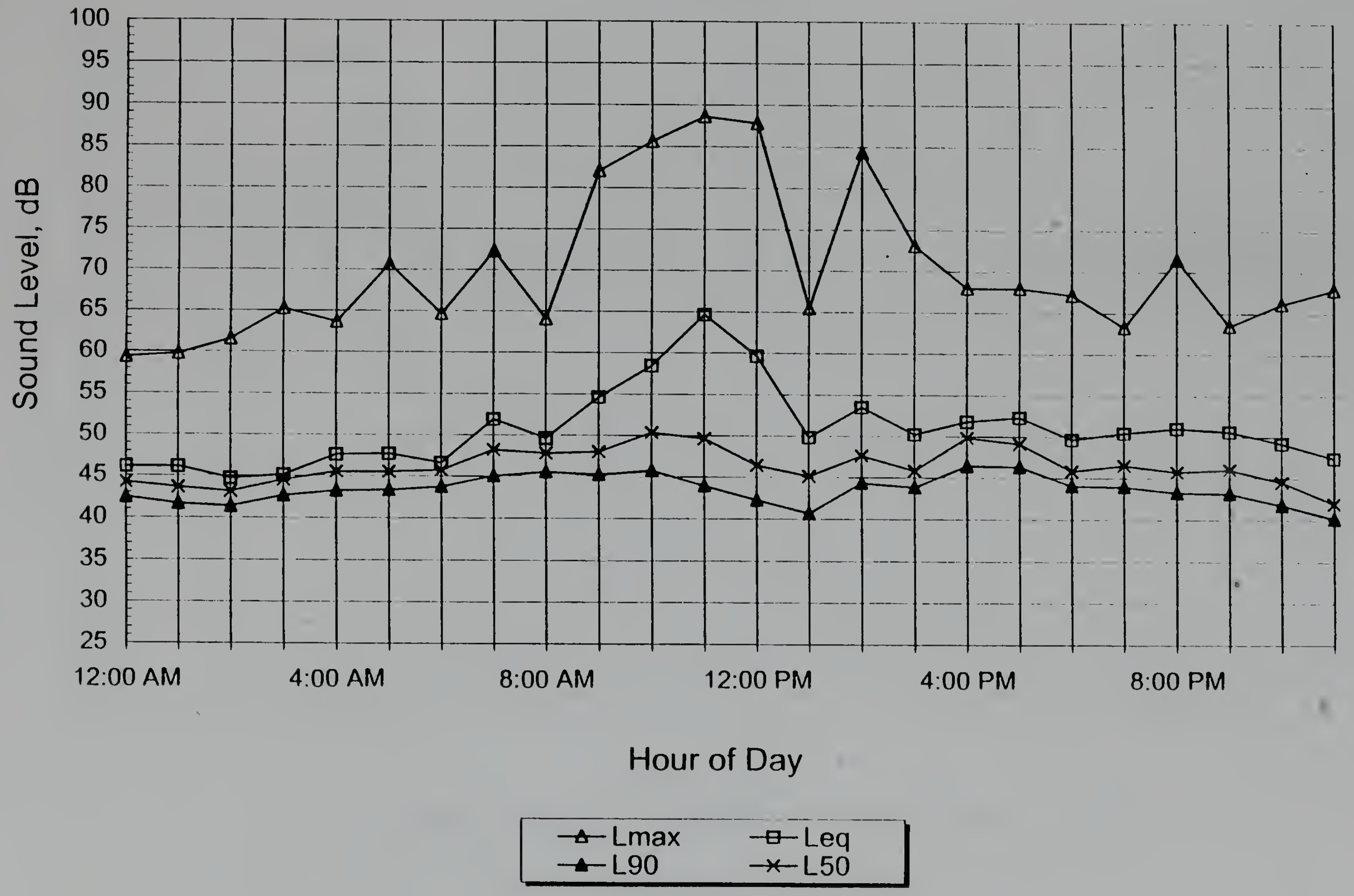
December 18, 1999



Measured Hourly Noise Levels

Site 3: 37084 Laurel Street- Newark, CA

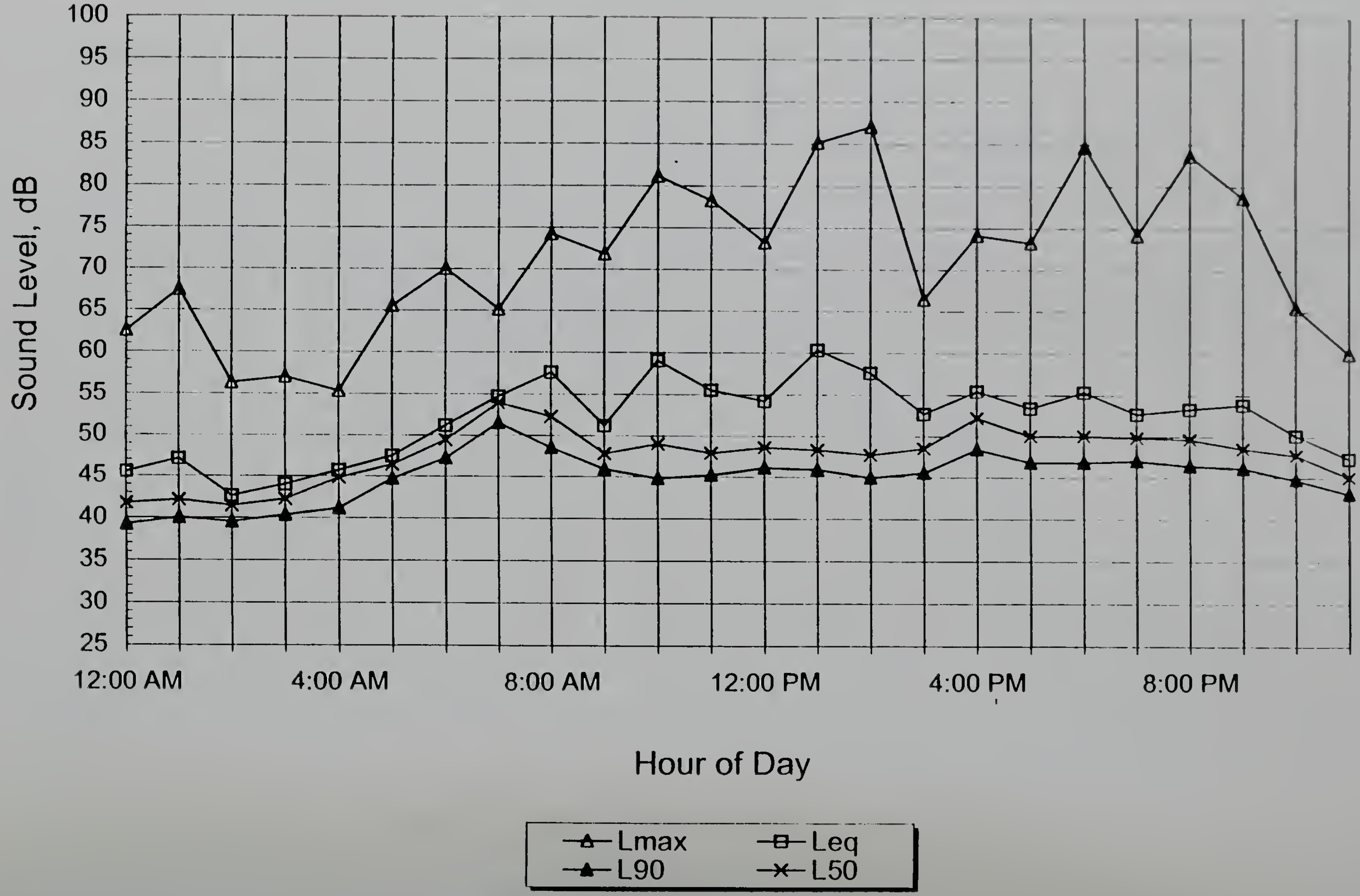
December 19, 1999



Measured Hourly Noise Levels

Site 3: 37084 Laurel Street- Newark, CA

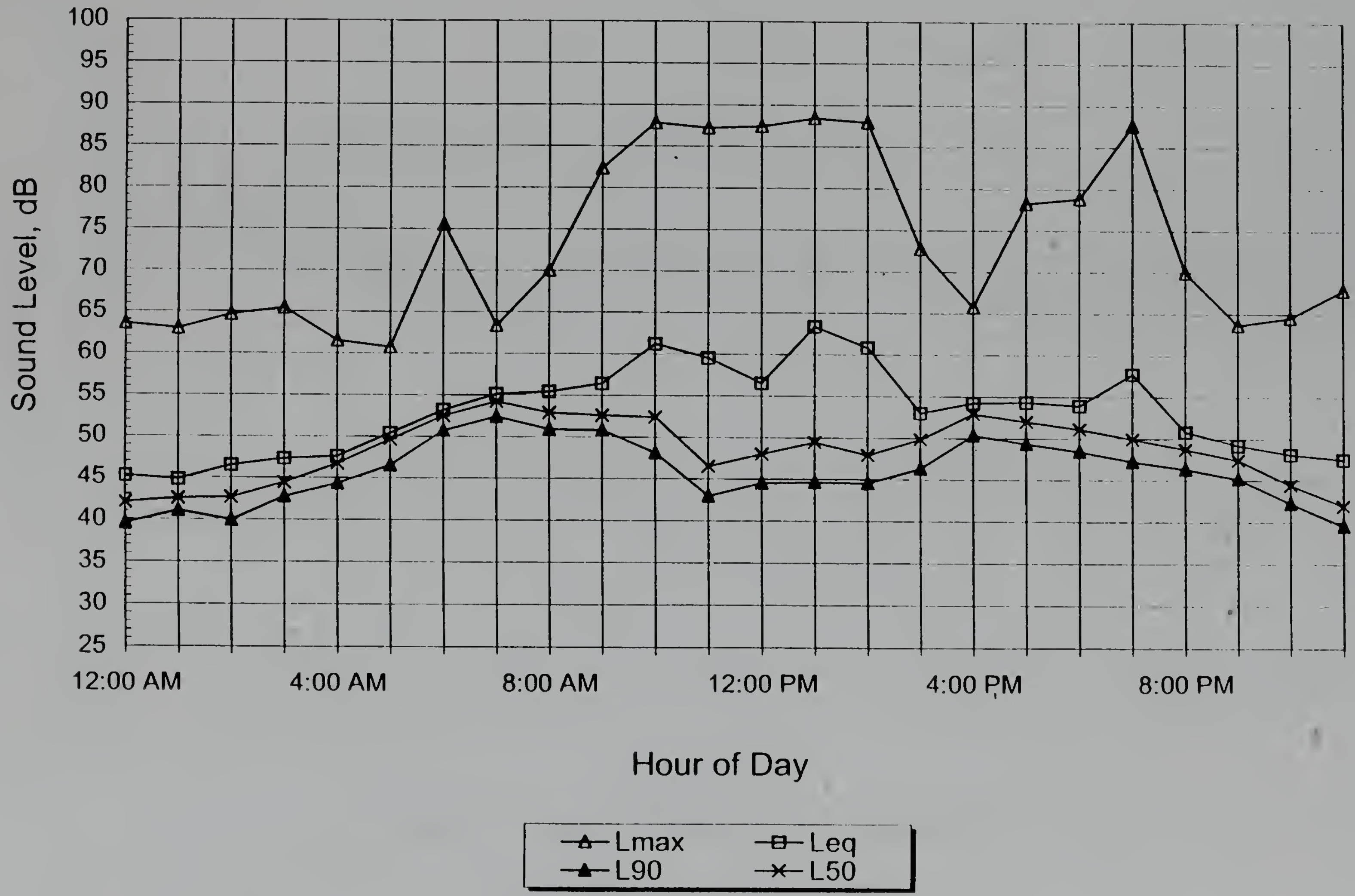
December 20, 1999



Measured Hourly Noise Levels

Site 3: 37084 Laurel Street- Newark, CA

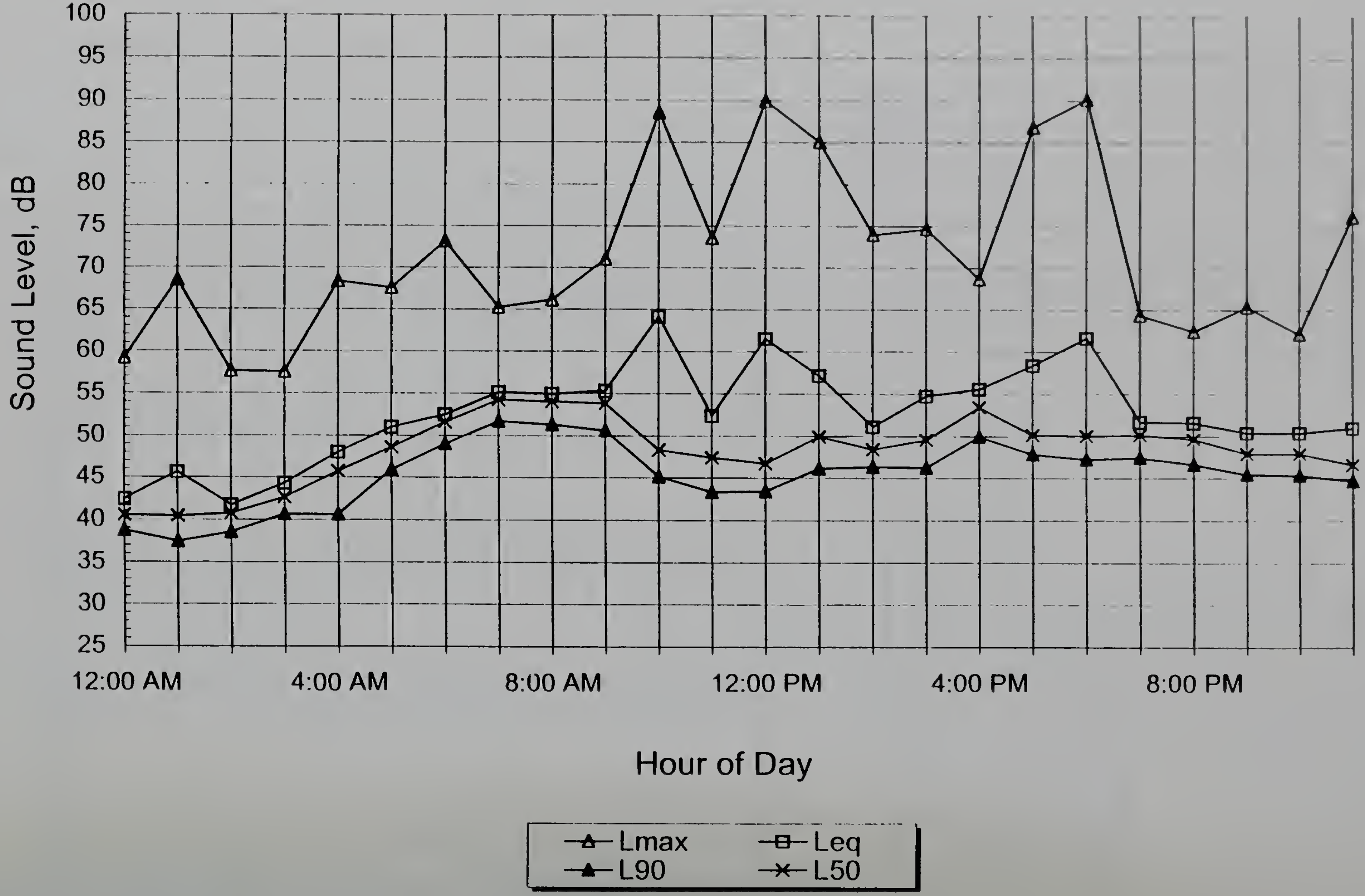
December 21, 1999



Measured Hourly Noise Levels

Site 3: 37084 Laurel Street- Newark, CA

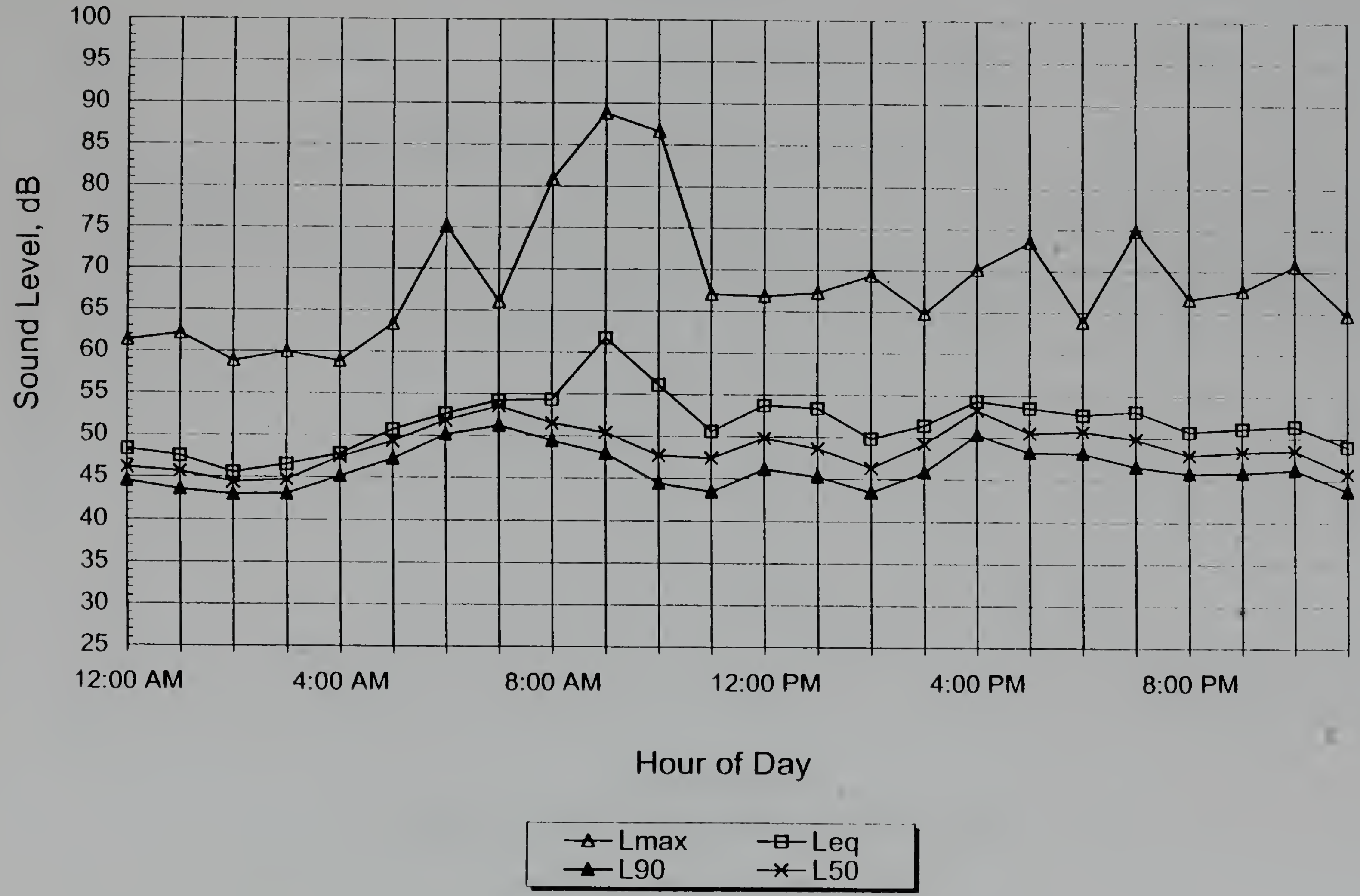
December 22, 1999



Measured Hourly Noise Levels

Site 3: 37084 Laurel Street- Newark, CA

December 23, 1999



Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 3: 37084 Laurel Street- Newark, CA

December 17, 1999

Hour	Leq	Lmax	L50	L90
0:00	48.4	66.5	45.6	43.7
1:00	47.6	65.7	43.9	42.3
2:00	46.7	61.1	44.6	43.1
3:00	46.7	60.5	44.8	43.2
4:00	49.1	63.1	48.0	44.6
5:00	50.8	62.5	50.2	48.5
6:00	53.7	65.0	53.4	52.0
7:00	54.6	65.9	53.9	52.5
8:00	53.7	71.5	52.3	49.9
9:00	54.2	76.8	50.6	48.7
10:00	58.9	88.0	51.0	48.8
11:00	66.7	90.0	50.5	48.1
12:00	65.5	92.8	49.1	46.3
13:00	68.5	91.2	50.8	47.0
14:00:00	60.2	91.8	51.0	47.8
15:00:00	55.6	74.3	52.2	45.9
16:00:00	56.5	68.4	53.1	49.8
17:00:00	53.9	64.3	51.6	49.5
18:00:00	53.4	67.4	50.9	48.5
19:00:00	51.8	64.4	48.4	46.5
20:00:00	51.1	69.4	48.1	46.2
21:00:00	48.8	79.8	45.6	43.5
22:00:00	47.4	66.7	44.6	41.8
23:00:00	45.5	62.0	43.3	41.6

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	68.5	45.5	61.1	49.2	59.3
Lmax	92.8	60.5	86.4	64.2	84.4
L50	53.9	43.3	51.0	47.9	50.1
L90	52.5	41.6	47.9	44.5	46.7

Ldn	60.5
CNEL	60.6

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 3: 37084 Laurel Street- Newark, CA

December 18, 1999

Hour	Leq	Lmax	L50	L90
0:00	47.8	68.7	42.6	40.2
1:00	44.7	63.6	40.6	38.3
2:00	45.6	65.6	41.1	39.1
3:00	43.4	60.0	40.7	37.9
4:00	41.0	59.1	40.2	38.3
5:00	41.2	53.0	40.3	38.6
6:00	44.1	59.6	43.4	39.5
7:00	49.1	62.0	46.8	42.9
8:00	46.1	58.6	43.6	40.9
9:00	54.3	88.5	45.2	42.9
10:00	50.1	60.7	44.0	41.1
11:00	50.7	69.6	47.4	42.2
12:00	53.5	72.0	50.1	43.2
13:00	55.8	83.1	48.9	44.3
14:00:00	71.2	91.9	50.5	44.5
15:00:00	67.5	91.1	49.3	45.6
16:00:00	58.3	86.1	50.7	46.9
17:00:00	68.0	91.4	48.4	45.7
18:00:00	61.4	90.8	48.1	45.2
19:00:00	49.7	63.6	47.8	46.0
20:00:00	49.3	68.1	47.0	45.3
21:00:00	50.1	64.1	47.3	45.1
22:00:00	49.4	66.2	46.1	44.1
23:00:00	46.3	60.1	45.1	43.2

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	71.2	41.0	62.8	45.6	60.8
Lmax	91.9	53.0	86.6	63.8	84.5
L50	50.7	40.2	48.1	42.8	46.8
L90	46.9	37.9	44.1	39.9	42.5

Ldn	61.2
CNEL	61.3

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 3: 37084 Laurel Street- Newark, CA

December 19. 1999

Hour	Leq	Lmax	L50	L90
0:00	46.1	59.3	44.2	42.4
1:00	46.1	59.7	43.6	41.6
2:00	44.7	61.5	43.1	41.3
3:00	45.1	65.2	44.5	42.6
4:00	47.6	63.6	45.5	43.2
5:00	47.7	70.6	45.5	43.3
6:00	46.6	64.6	45.7	43.7
7:00	51.9	72.2	48.2	45.0
8:00	49.6	64.0	47.8	45.5
9:00	54.6	82.0	48.0	45.2
10:00	58.4	85.6	50.3	45.7
11:00	64.6	88.6	49.6	43.9
12:00	59.6	87.8	46.4	42.2
13:00	49.8	65.4	45.1	40.6
14:00:00	53.5	84.3	47.6	44.3
15:00:00	50.2	73.0	45.8	43.8
16:00:00	51.8	67.9	49.8	46.4
17:00:00	52.3	67.9	49.1	46.3
18:00:00	49.6	67.1	45.8	44.0
19:00:00	50.4	63.2	46.5	43.9
20:00:00	51.0	71.4	45.7	43.2
21:00:00	50.6	63.4	46.0	43.1
22:00:00	49.2	66.1	44.5	41.7
23:00:00	47.4	67.8	41.9	40.1

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	64.6	44.7	56.2	46.9	54.4
Lmax	88.6	59.3	81.7	65.7	79.7
L50	50.3	41.9	47.8	44.4	46.8
L90	46.4	40.1	44.2	42.2	43.5

Ldn	56.5
CNEL	56.7

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 3: 37084 Laurel Street- Newark, CA

December 20, 1999

Hour	Leq	Lmax	L50	L90
0:00	45.5	62.5	41.7	39.2
1:00	47.1	67.4	42.1	40.0
2:00	42.6	56.3	41.4	39.5
3:00	44.0	57.0	42.2	40.3
4:00	45.7	55.3	44.8	41.1
5:00	47.5	65.5	46.4	44.7
6:00	51.2	70.0	49.4	47.2
7:00	54.7	65.1	53.9	51.5
8:00	57.6	74.2	52.3	48.5
9:00	51.2	71.8	47.8	45.9
10:00	59.0	81.1	49.0	44.8
11:00	55.5	78.2	47.9	45.2
12:00	54.2	73.2	48.6	46.1
13:00	60.3	85.1	48.3	45.9
14:00:00	57.6	87.0	47.7	44.9
15:00:00	52.7	66.4	48.5	45.5
16:00:00	55.4	74.1	52.2	48.4
17:00:00	53.4	73.2	50.0	46.8
18:00:00	55.3	84.6	50.0	46.8
19:00:00	52.7	74.1	49.8	47.0
20:00:00	53.3	83.6	49.6	46.4
21:00:00	53.8	78.6	48.5	46.1
22:00:00	50.1	65.4	47.7	44.7
23:00:00	47.3	59.9	45.0	43.0

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	60.3	42.6	55.9	47.5	54.2
Lmax	87.0	55.3	80.7	64.7	78.7
L50	53.9	41.4	50.0	45.4	48.8
L90	51.5	39.2	46.7	42.2	45.0

Ldn	56.6
CNEL	57.1

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 3: 37084 Laurel Street- Newark, CA

December 21, 1999

Hour	Leq	Lmax	L50	L90
0:00	45.2	63.5	42.0	39.5
1:00	44.8	62.9	42.5	41.0
2:00	46.5	64.6	42.6	39.9
3:00	47.3	65.4	44.4	42.7
4:00	47.6	61.5	46.7	44.3
5:00	50.4	60.7	49.6	46.5
6:00	53.2	75.5	52.5	50.7
7:00	55.1	63.3	54.2	52.4
8:00	55.4	70.0	52.9	50.9
9:00	56.4	82.3	52.6	50.8
10:00	61.2	87.8	52.4	48.1
11:00	59.5	87.2	46.5	42.9
12:00	56.5	87.4	48.0	44.5
13:00	63.3	88.4	49.4	44.6
14:00:00	60.8	87.9	47.9	44.5
15:00:00	53.0	72.7	49.8	46.3
16:00:00	54.2	65.7	52.9	50.3
17:00:00	54.3	78.2	52.0	49.3
18:00:00	53.9	78.8	51.1	48.4
19:00:00	57.7	87.6	49.9	47.2
20:00:00	50.8	69.9	48.7	46.3
21:00:00	49.2	63.6	47.4	45.1
22:00:00	48.1	64.5	44.4	42.2
23:00:00	47.5	67.8	41.9	39.5

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	63.3	44.8	57.7	48.6	56.0
Lmax	88.4	60.7	84.2	68.1	82.2
L50	54.2	41.9	51.0	46.9	49.8
L90	52.4	39.5	47.4	42.9	45.7

Ldn	58.1
CNEL	58.5

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 3: 37084 Laurel Street- Newark, CA

December 22, 1999

Hour	Leq	Lmax	L50	L90
0:00	42.4	59.1	40.5	38.7
1:00	45.6	68.4	40.4	37.4
2:00	41.7	57.6	40.7	38.5
3:00	44.3	57.5	42.6	40.6
4:00	48.0	68.3	45.7	40.6
5:00	51.0	67.5	48.6	45.9
6:00	52.5	73.1	51.6	49.0
7:00	55.1	65.2	54.2	51.7
8:00	54.9	66.1	54.0	51.3
9:00	55.3	71.0	53.8	50.6
10:00	64.1	88.5	48.3	45.1
11:00	52.4	73.5	47.4	43.3
12:00	61.5	89.9	46.7	43.4
13:00	57.1	85.0	49.9	46.1
14:00:00	51.1	73.9	48.4	46.3
15:00:00	54.7	74.6	49.5	46.2
16:00:00	55.5	68.6	53.4	49.9
17:00:00	58.3	86.8	50.1	47.8
18:00:00	61.6	90.1	50.0	47.2
19:00:00	51.7	64.3	50.1	47.4
20:00:00	51.6	62.4	49.6	46.6
21:00:00	50.4	65.3	47.9	45.4
22:00:00	50.4	62.1	47.9	45.3
23:00:00	51.0	76.1	46.6	44.7

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	64.1	41.7	57.8	48.9	56.0
Lmax	90.1	57.5	83.8	69.7	81.9
L50	54.2	40.4	50.9	46.6	49.8
L90	51.7	37.4	47.2	42.3	45.4

Ldn	58.2
CNEL	58.4

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 3: 37084 Laurel Street- Newark, CA

December 23, 1999

Hour	Leq	Lmax	L50	L90
0:00	48.3	61.3	46.1	44.5
1:00	47.5	62.1	45.6	43.5
2:00	45.5	58.8	44.4	42.9
3:00	46.5	59.9	44.7	43.0
4:00	47.8	58.8	47.4	45.1
5:00	50.7	63.3	49.3	47.2
6:00	52.6	75.1	51.8	50.1
7:00	54.2	66.0	53.5	51.2
8:00	54.3	80.8	51.5	49.4
9:00	61.7	88.8	50.4	47.9
10:00	56.1	86.6	47.7	44.4
11:00	50.6	67.0	47.4	43.4
12:00	53.7	66.8	49.8	46.1
13:00	53.4	67.2	48.6	45.2
14:00:00	49.8	69.3	46.3	43.4
15:00:00	51.4	64.8	49.2	45.8
16:00:00	54.3	70.1	53.2	50.3
17:00:00	53.5	73.4	50.5	48.2
18:00:00	52.7	63.8	50.7	48.1
19:00:00	53.1	74.8	49.8	46.5
20:00:00	50.7	66.6	47.9	45.7
21:00:00	51.1	67.6	48.3	45.8
22:00:00	51.4	70.6	48.5	46.2
23:00:00	49.0	64.7	45.7	43.7

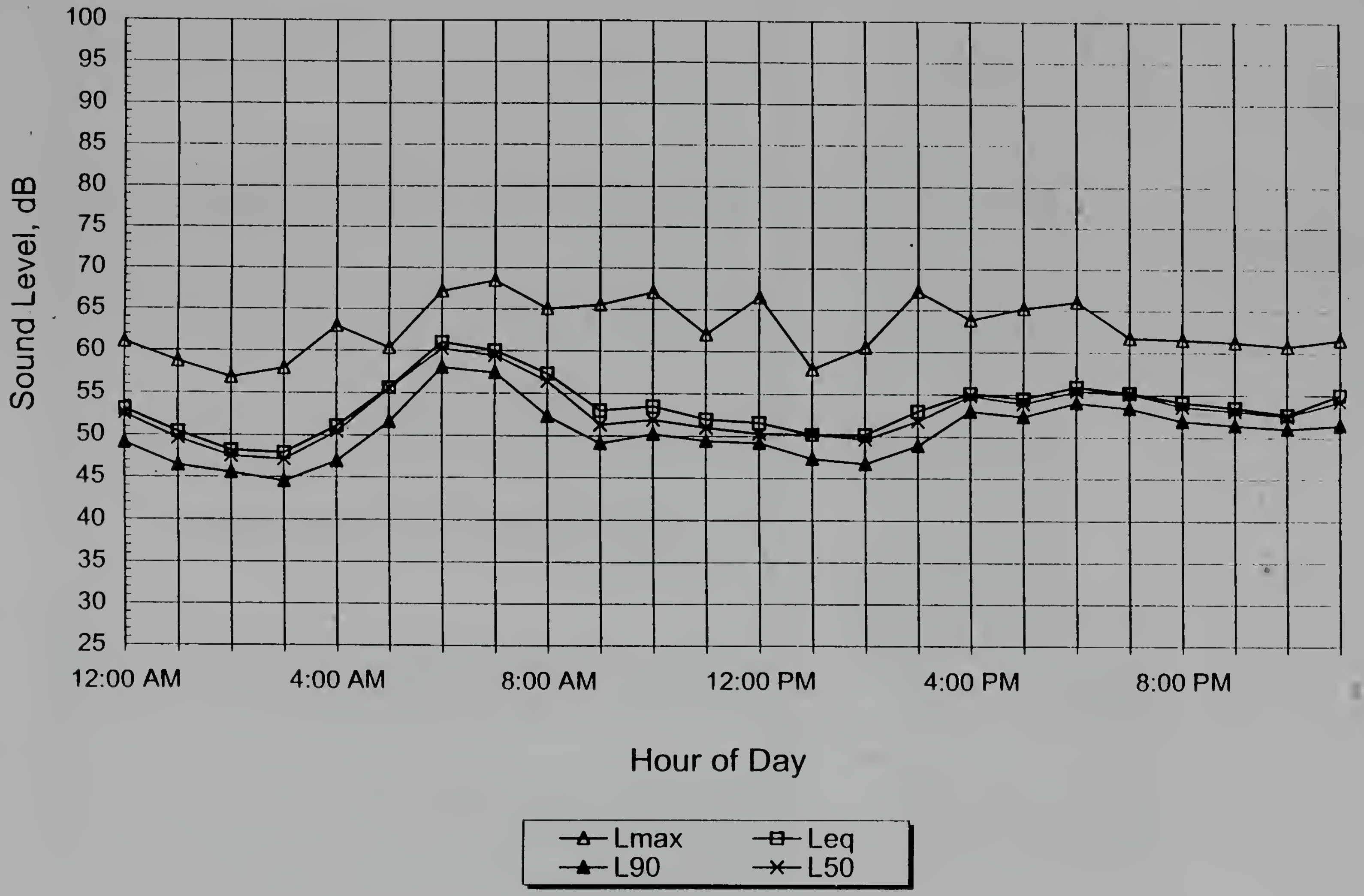
Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	61.7	45.5	54.6	49.4	53.3
Lmax	88.8	58.8	79.8	67.8	77.9
L50	53.5	44.4	50.1	47.7	49.4
L90	51.2	42.9	46.8	45.1	46.2

Ldn	57.0
CNEL	57.4

Measured Hourly Noise Levels

Site 4: 923 Eden Avenue- San Jose

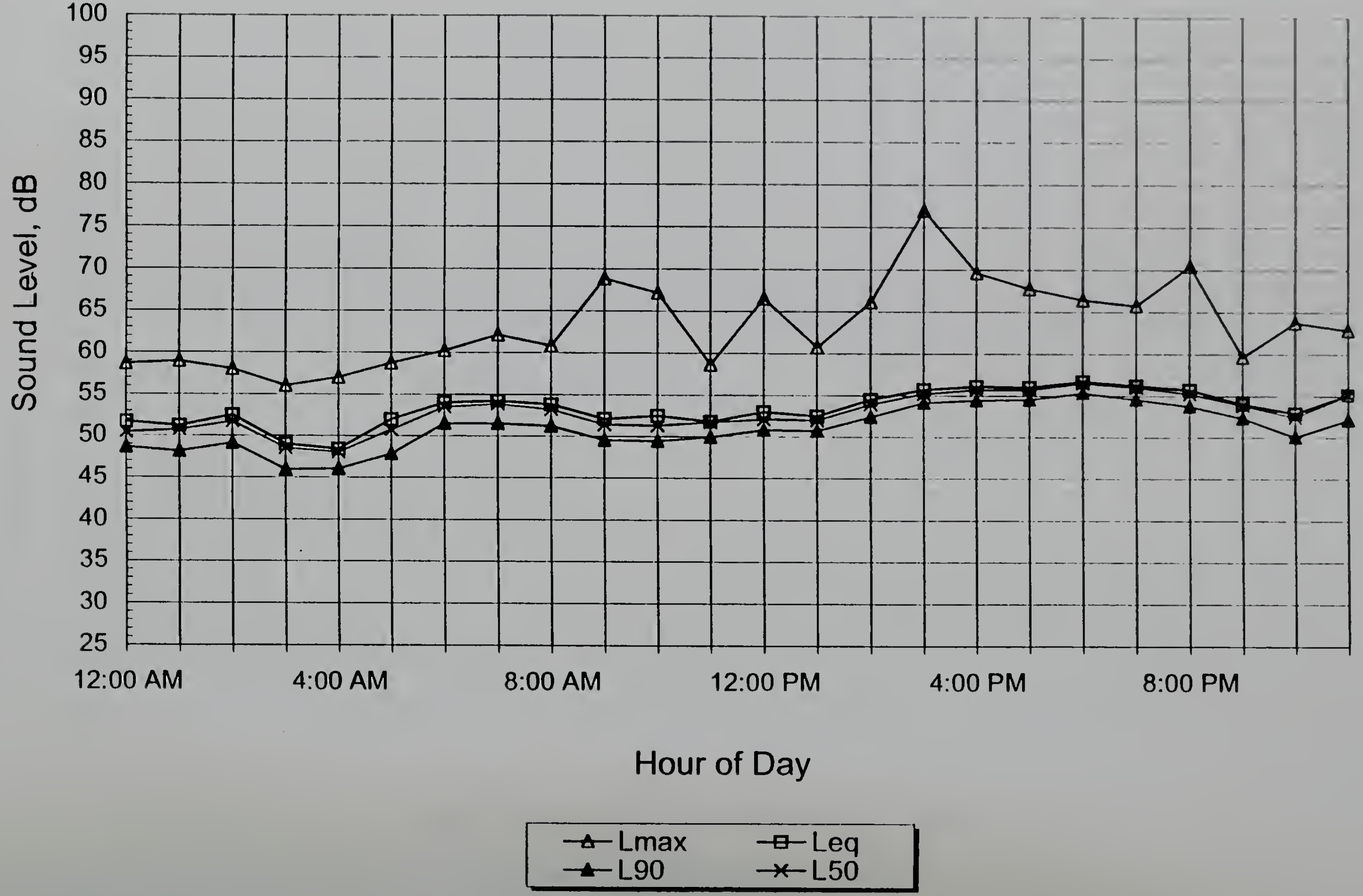
December 17, 1999



Measured Hourly Noise Levels

Site 4: 923 Eden Avenue- San Jose

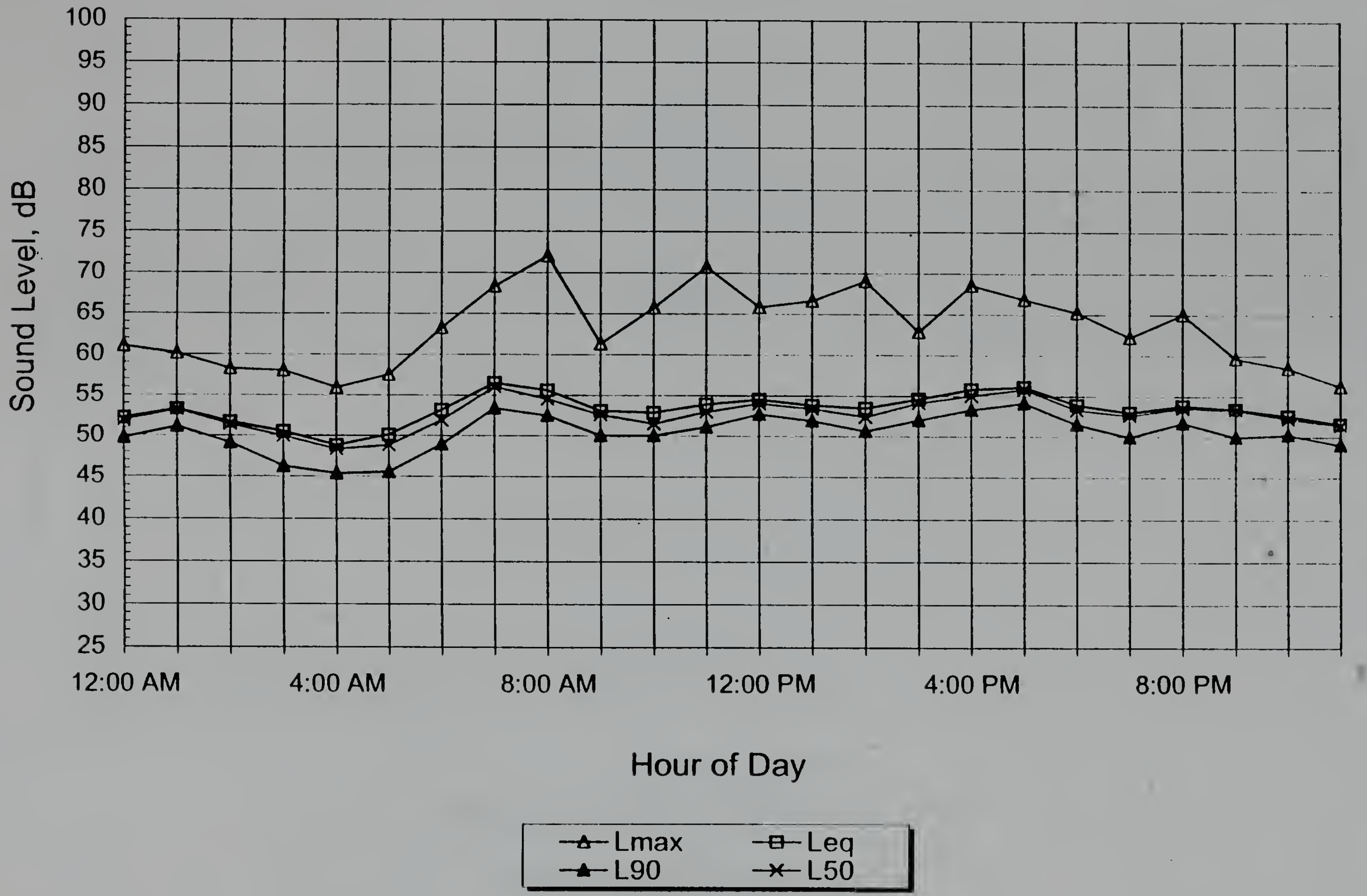
December 18, 1999



Measured Hourly Noise Levels

Site 4: 923 Eden Avenue- San Jose

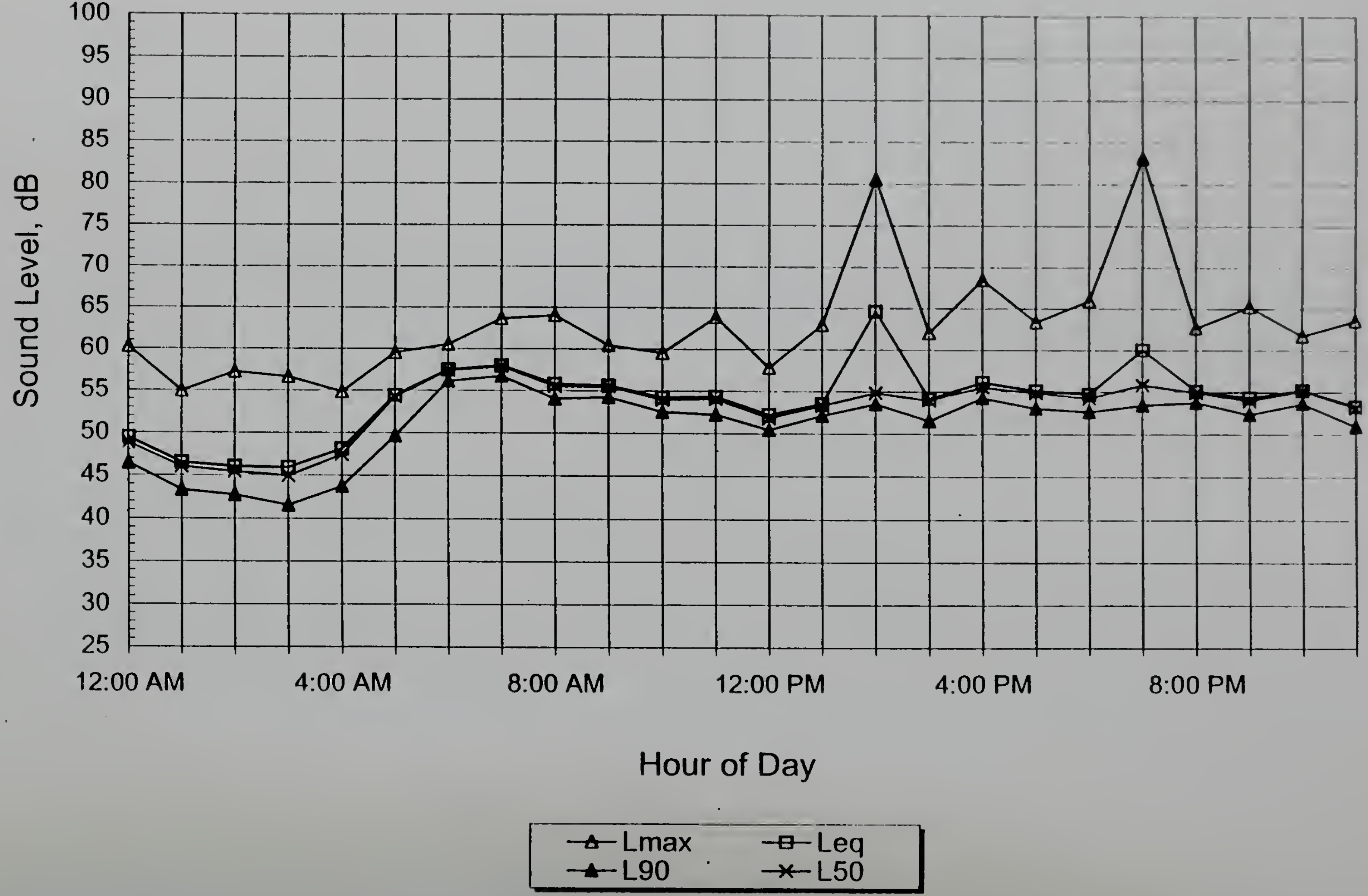
December 19, 1999



Measured Hourly Noise Levels

Site 4: 923 Eden Avenue- San Jose

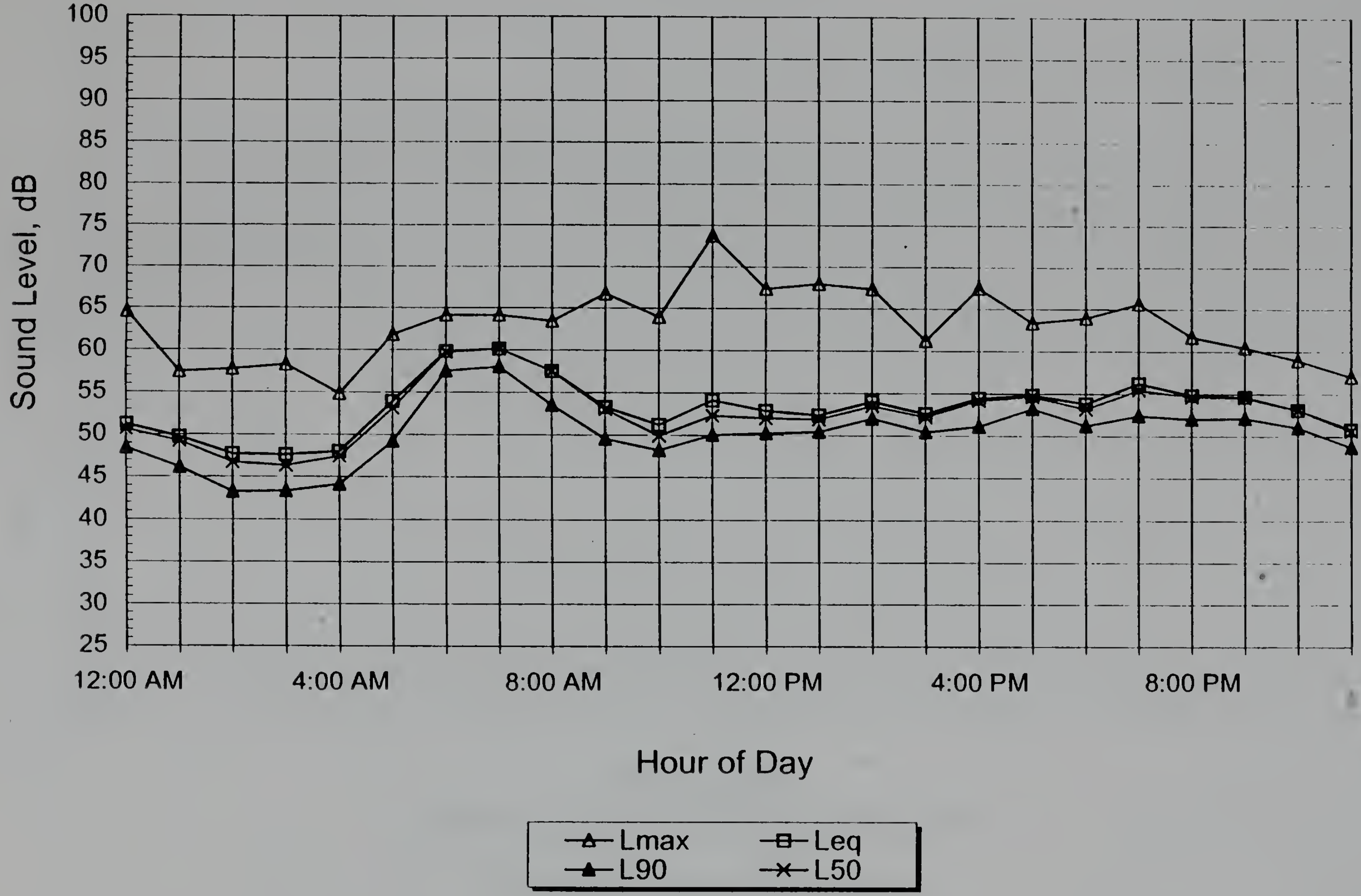
December 20, 1999



Measured Hourly Noise Levels

Site 4: 923 Eden Avenue- San Jose

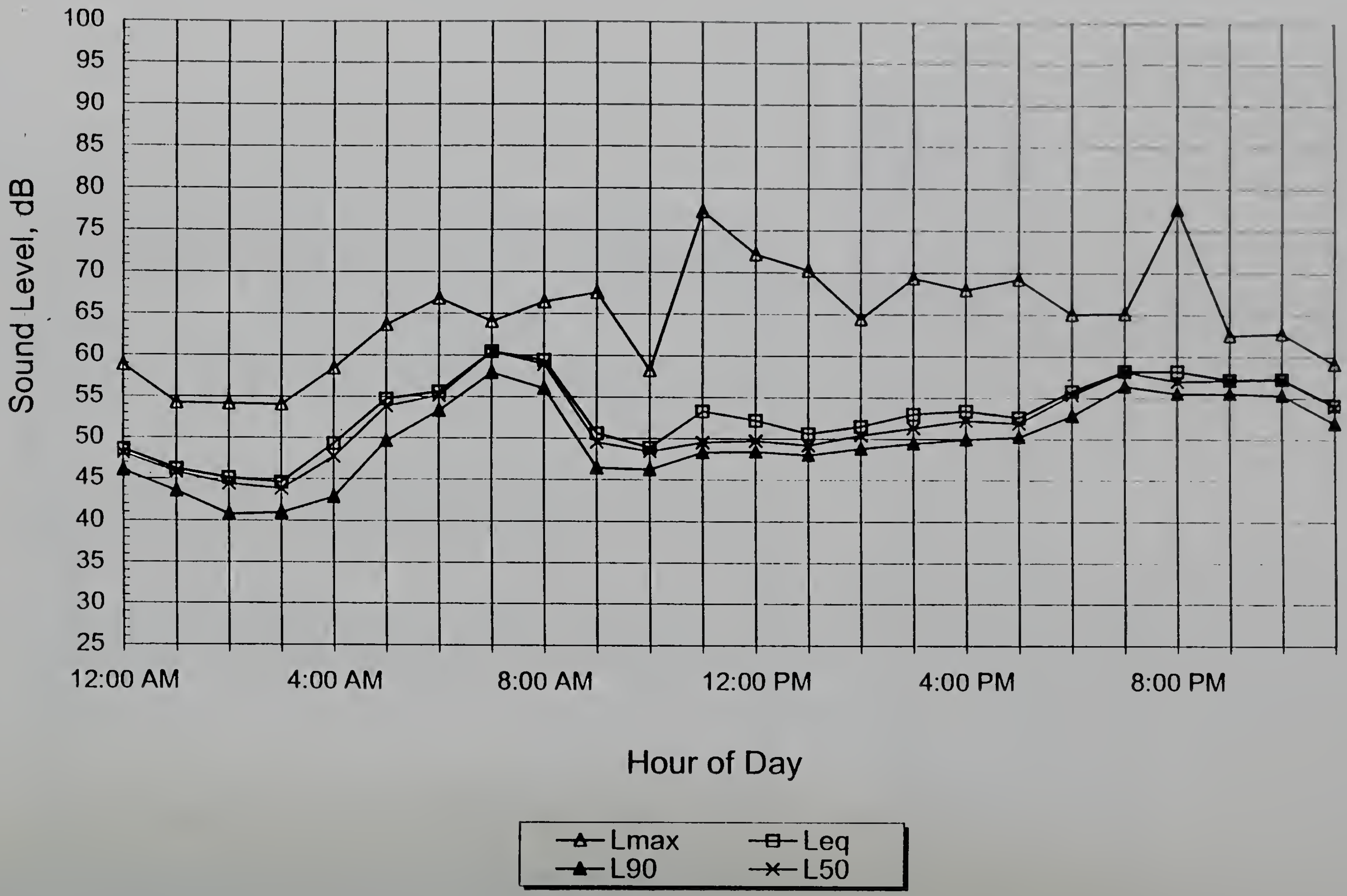
December 21, 1999



Measured Hourly Noise Levels

Site 4: 923 Eden Avenue- San Jose

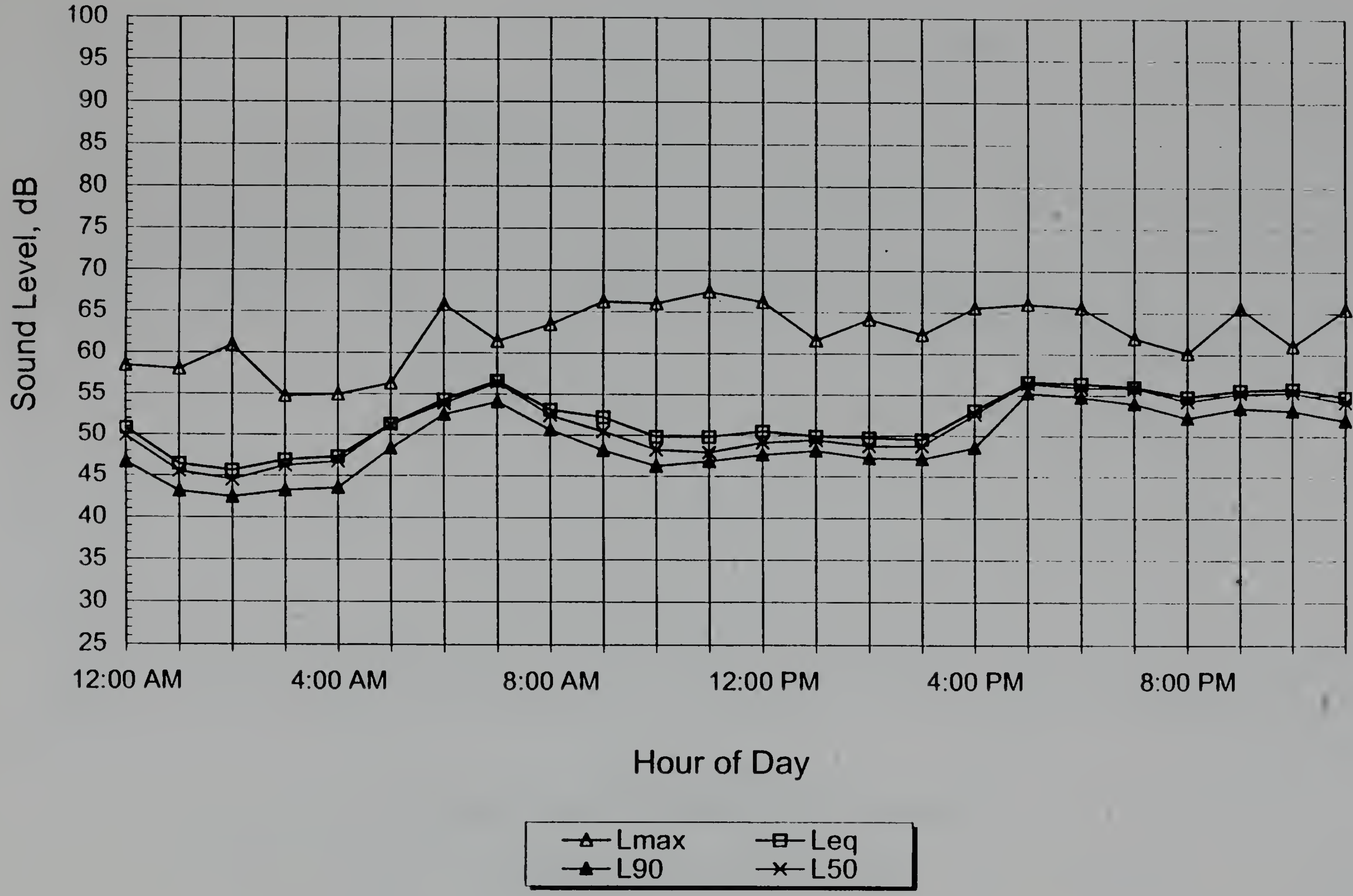
December 22, 1999



Measured Hourly Noise Levels

Site 4: 923 Eden Avenue- San Jose

December 23, 1999



Brown Buntin Associates Inc.
Measured Hourly Noise Levels
Site 4: 923 Eden Avenue- San Jose
December 17, 1999

Hour	Leq	Lmax	L50	L90
0:00	53.1	61	52.5	49.1
1:00	50.4	58.7	49.6	46.4
2:00	48.2	56.8	47.5	45.5
3:00	47.9	57.9	47.1	44.5
4:00	51.1	62.9	50.4	46.9
5:00	55.6	60.3	55.5	51.6
6:00	61	67.1	60.2	58
7:00	60	68.4	59.4	57.4
8:00	57.3	65	56.4	52.3
9:00	53	65.5	51.3	49.1
10:00	53.5	67	51.9	50.2
11:00	52	62	51	49.4
12:00	51.6	66.5	50.3	49.2
13:00	50.2	57.9	50.2	47.3
14:00:00	50.2	60.5	49.6	46.7
15:00:00	53	67.2	51.8	48.9
16:00:00	55.1	63.8	54.8	53
17:00:00	54.5	65.2	53.9	52.4
18:00:00	55.9	66	55.4	54
19:00:00	55.2	61.7	55.1	53.4
20:00:00	54.1	61.5	53.6	51.9
21:00:00	53.5	61.2	53.1	51.4
22:00:00	52.7	60.7	52.5	51
23:00:00	55	61.5	54.2	51.4

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	61.0	47.9	54.8	54.8	54.8
Lmax	68.4	56.8	64.8	61.9	63.9
L50	60.2	47.1	54.1	54.1	54.1
L90	58.0	44.5	51.1	49.4	50.5

Ldn	61.2
CNEL	61.4

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 4: 923 Eden Avenue- San Jose

December 18, 1999

Hour	Leq	Lmax	L50	L90
0:00	51.7	58.6	50.4	48.6
1:00	51.2	58.9	50.7	48.1
2:00	52.5	58	51.7	49.1
3:00	49	56	48.5	45.9
4:00	48.4	57	48	46
5:00	52	58.7	50.7	47.8
6:00	54	60.2	53.5	51.5
7:00	54.2	62.1	53.8	51.5
8:00	53.8	60.8	53.2	51.2
9:00	52.1	68.8	51.4	49.5
10:00	52.5	67.1	51.3	49.4
11:00	51.8	58.6	51.7	49.9
12:00	53	66.5	52.1	50.8
13:00	52.5	60.7	52	50.7
14:00:00	54.5	66.1	53.9	52.4
15:00:00	55.7	76.9	55.2	54.1
16:00:00	56.1	69.6	55.7	54.4
17:00:00	56	67.7	55.7	54.5
18:00:00	56.7	66.4	56.5	55.3
19:00:00	56.2	65.7	56	54.5
20:00:00	55.7	70.4	55.2	53.7
21:00:00	54	59.6	53.8	52.3
22:00:00	52.9	63.7	52.4	50
23:00:00	55.1	62.8	55.1	52.1

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	**56.7**	**48.4**	**54.6**	**52.3**	**53.9**
Lmax	**76.9**	**56.0**	**68.6**	**60.0**	**67.0**
L50	**56.5**	**48.0**	**54.2**	**51.8**	**53.4**
L90	**55.3**	**45.9**	**52.3**	**48.8**	**51.0**

Ldn	**59.1**
CNEL	**59.6**

Brown Buntin Associates Inc.
Measured Hourly Noise Levels
Site 4: 923 Eden Avenue- San Jose
December 19, 1999

Hour	Leq	Lmax	L50	L90
0:00	52.2	61	51.9	49.7
1:00	53.3	60.1	53.2	51.1
2:00	51.7	58.2	51.4	49.1
3:00	50.5	58	49.9	46.2
4:00	48.8	55.9	48.3	45.3
5:00	50.1	57.5	48.8	45.5
6:00	53.2	63.2	51.9	48.9
7:00	56.5	68.3	56	53.4
8:00	55.6	72	54.5	52.5
9:00	53.1	61.3	52.6	50
10:00	52.9	65.7	51.5	50
11:00	53.9	70.7	53	51.1
12:00	54.5	65.8	54	52.7
13:00	53.8	66.6	53.4	51.9
14:00:00	53.5	69	52.4	50.6
15:00:00	54.6	62.8	54.1	52
16:00:00	55.8	68.5	55	53.3
17:00:00	56.1	66.8	55.8	54.1
18:00:00	53.9	65.2	53.3	51.5
19:00:00	53	62.2	52.6	49.9
20:00:00	53.8	65	53.5	51.7
21:00:00	53.4	59.6	53.3	49.9
22:00:00	52.6	58.4	52.2	50.2
23:00:00	51.6	56.2	51.4	49

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	56.5	48.8	54.5	51.8	53.6
Lmax	72.0	55.9	67.2	59.3	65.6
L50	56.0	48.3	53.8	51.3	53.0
L90	54.1	45.3	51.6	48.3	50.4

Ldn	58.7
CNEL	59.0

Brown Buntin Associates Inc.
Measured Hourly Noise Levels
Site 4: 923 Eden Avenue- San Jose
December 20, 1999

Hour	Leq	Lmax	L50	L90
0:00	49.4	60.2	48.8	46.4
1:00	46.5	54.9	46	43.3
2:00	46	57.2	45.4	42.7
3:00	45.9	56.6	44.9	41.5
4:00	48.1	54.8	47.4	43.7
5:00	54.4	59.5	54.2	49.6
6:00	57.5	60.5	57.4	56.1
7:00	58	63.6	57.9	56.7
8:00	55.8	64	55.5	54
9:00	55.6	60.4	55.5	54.2
10:00	54.2	59.5	53.9	52.5
11:00	54.3	63.8	54	52.2
12:00	52.2	57.8	51.8	50.4
13:00	53.5	62.9	53.3	52.1
14:00:00	64.6	80.5	54.8	53.5
15:00:00	54.1	62	53.9	51.5
16:00:00	56.1	68.4	55.5	54.2
17:00:00	55.1	63.3	54.8	53
18:00:00	54.7	65.9	54.2	52.6
19:00:00	60	83.1	55.8	53.4
20:00:00	55.1	62.6	54.9	53.7
21:00:00	54.3	65.2	53.9	52.3
22:00:00	55.2	61.7	55.1	53.6
23:00:00	53.3	63.5	53.1	50.9

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	64.6	45.9	57.3	52.7	56.1
Lmax	83.1	54.8	73.7	59.7	71.7
L50	57.9	44.9	54.9	52.4	54.1
L90	56.7	41.5	53.1	47.5	51.0

Ldn	60.1
CNEL	60.6

Brown Buntin Associates Inc.

Measured Hourly Noise Levels
Site 4: 923 Eden Avenue- San Jose
December 21, 1999

Hour	Leq	Lmax	L50	L90
0:00	51.2	64.5	50.6	48.4
1:00	49.7	57.4	49.2	46.1
2:00	47.7	57.7	46.7	43.2
3:00	47.6	58.2	46.3	43.3
4:00	48	54.8	47.4	44.1
5:00	53.9	61.8	53.1	49.2
6:00	59.8	64.1	59.7	57.5
7:00	60.1	64.1	60.1	58
8:00	57.5	63.4	57.5	53.5
9:00	53.3	66.7	53	49.5
10:00	51.2	63.9	49.9	48.2
11:00	54.1	73.7	52.3	50
12:00	52.9	67.3	52	50.2
13:00	52.4	67.9	51.9	50.4
14:00:00	54	67.3	53.5	52
15:00:00	52.6	61.2	52.2	50.4
16:00:00	54.4	67.4	54.1	51.1
17:00:00	54.8	63.3	54.6	53.2
18:00:00	53.8	63.9	53.2	51.2
19:00:00	56.2	65.6	55.4	52.4
20:00:00	54.8	61.7	54.6	52
21:00:00	54.6	60.4	54.5	52.1
22:00:00	53.1	58.9	53.1	51
23:00:00	50.8	57	50.6	48.7

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	60.1	47.6	55.1	53.3	54.5
Lmax	73.7	54.8	66.7	60.6	65.2
L50	60.1	46.3	54.7	53.0	54.1
L90	58.0	43.2	51.6	47.9	50.2

Ldn	60.0
CNEL	60.4

Brown Buntin Associates Inc.

Measured Hourly Noise Levels
Site 4: 923 Eden Avenue- San Jose
December 22, 1999

Hour	Leq	Lmax	L50	L90
0:00	48.6	58.8	48.1	46
1:00	46.2	54.2	45.8	43.5
2:00	45.1	54.1	44.4	40.7
3:00	44.6	54	43.8	40.9
4:00	49.3	58.4	47.7	42.8
5:00	54.7	63.6	53.8	49.6
6:00	55.6	66.8	55.1	53.3
7:00	60.4	64	60.4	57.9
8:00	59.4	66.4	58.9	56
9:00	50.6	67.5	49.5	46.4
10:00	48.9	58.2	48.4	46.2
11:00	53.3	77.2	49.5	48.3
12:00	52.2	72.1	49.7	48.4
13:00	50.6	70.2	49.2	48
14:00:00	51.5	64.4	50.4	48.8
15:00:00	53	69.3	51.3	49.4
16:00:00	53.4	67.9	52.2	49.9
17:00:00	52.6	69.2	51.9	50.2
18:00:00	55.8	65	55.3	52.8
19:00:00	58.2	65.1	58.1	56.4
20:00:00	58.2	77.6	57	55.5
21:00:00	57.2	62.5	57.1	55.5
22:00:00	57.3	62.7	57.2	55.3
23:00:00	54.1	59.1	53.9	51.9

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	60.4	44.6	55.7	52.8	54.9
Lmax	77.6	54.0	70.9	61.2	69.1
L50	60.4	43.8	55.1	52.4	54.3
L90	57.9	40.7	51.3	47.1	49.7

Ldn	59.8
CNEL	60.4

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 4: 923 Eden Avenue- San Jose

December 23, 1999

Hour	Leq	Lmax	L50	L90
0:00	50.8	58.4	49.8	46.6
1:00	46.4	58	45.5	43.1
2:00	45.6	60.9	44.5	42.4
3:00	46.9	54.7	46.2	43.2
4:00	47.3	54.9	46.7	43.5
5:00	51.3	56.3	51.2	48.3
6:00	54.3	65.8	53.8	52.5
7:00	56.6	61.4	56.4	54
8:00	53.1	63.4	52.4	50.6
9:00	52.2	66.2	50.4	48.1
10:00	49.8	66	48.2	46.2
11:00	49.8	67.4	47.9	46.8
12:00	50.5	66.2	49.1	47.6
13:00	49.9	61.6	49.4	48.1
14:00:00	49.7	64.1	48.7	47.2
15:00:00	49.5	62.3	48.7	47.1
16:00:00	53.1	65.5	52.6	48.5
17:00:00	56.6	66	56.4	55.2
18:00:00	56.4	65.5	55.9	54.7
19:00:00	56	61.9	55.9	53.9
20:00:00	54.8	60.1	54.2	52.2
21:00:00	55.6	65.5	55.2	53.4
22:00:00	55.8	61	55.3	53.1
23:00:00	54.8	65.4	54.1	51.9

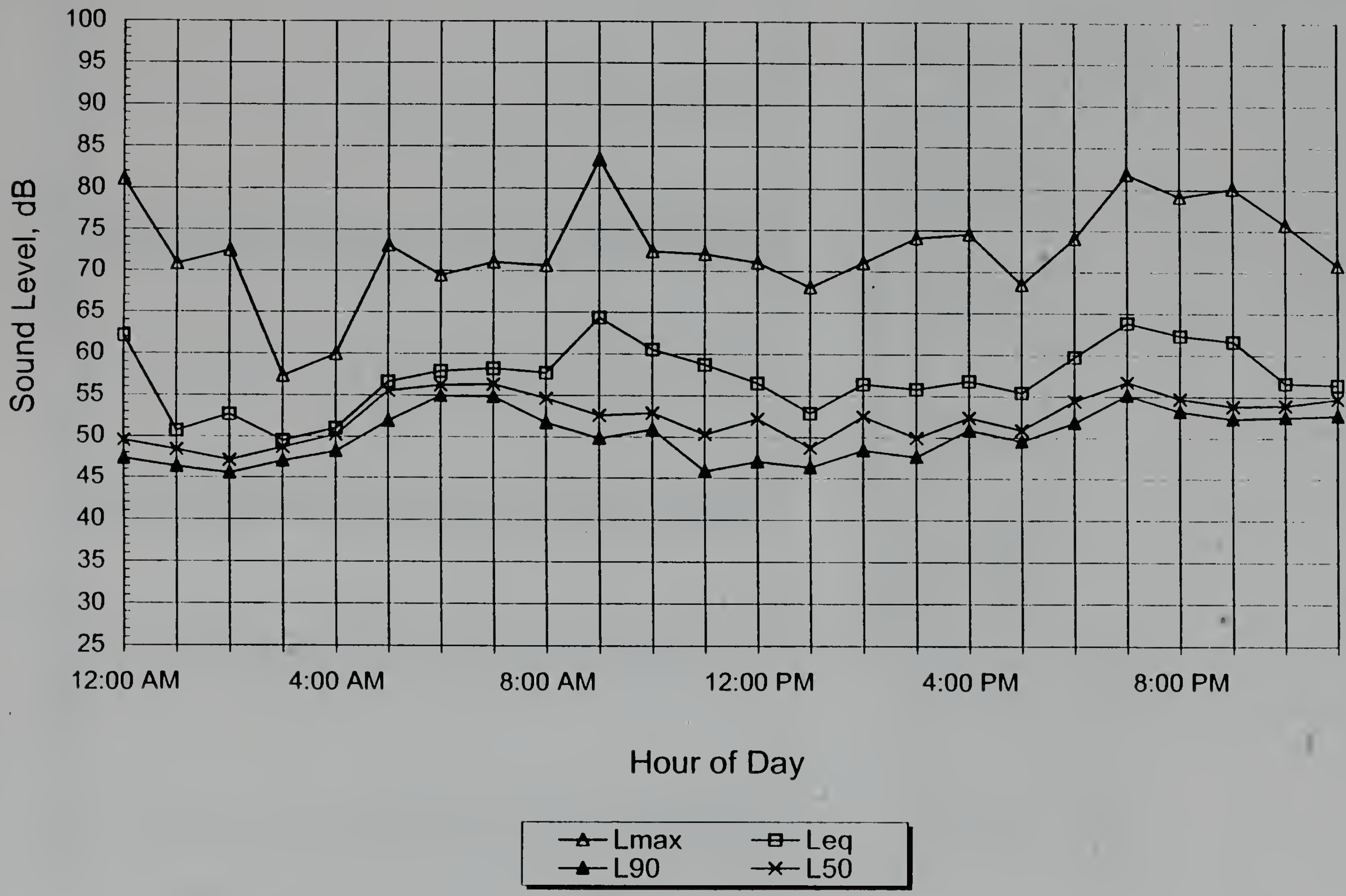
Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	56.6	45.6	53.8	51.9	53.2
Lmax	67.4	54.7	64.7	61.3	63.7
L50	56.4	44.5	53.2	51.3	52.6
L90	55.2	42.4	50.2	47.2	49.1

Ldn	58.6
CNEL	59.1

Measured Hourly Noise Levels

Site 5: 2928 Kentridge Drive- Milpitas, CA

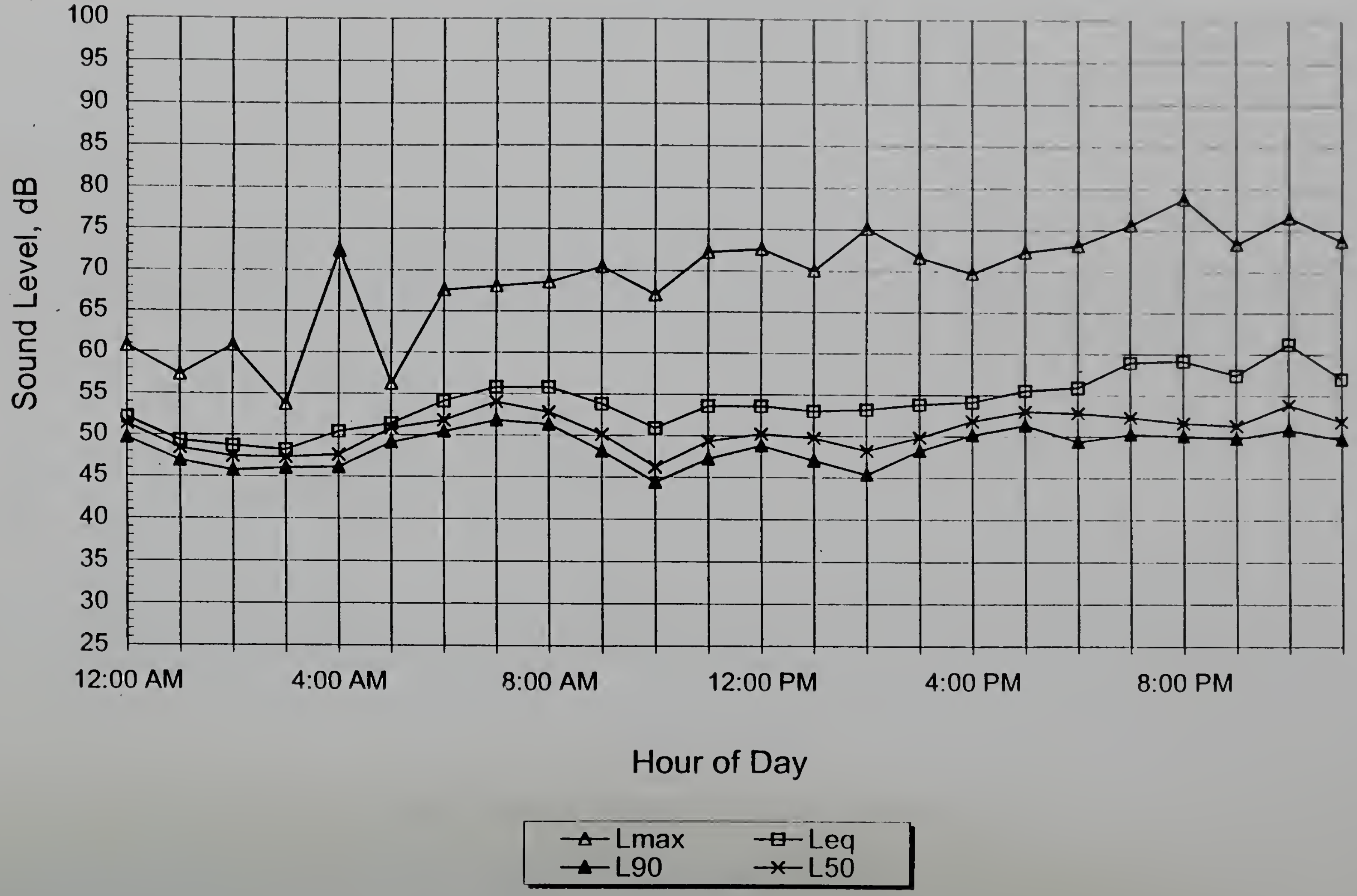
December 17, 1999



Measured Hourly Noise Levels

Site 5: 2928 Kentridge Drive- Milpitas, CA

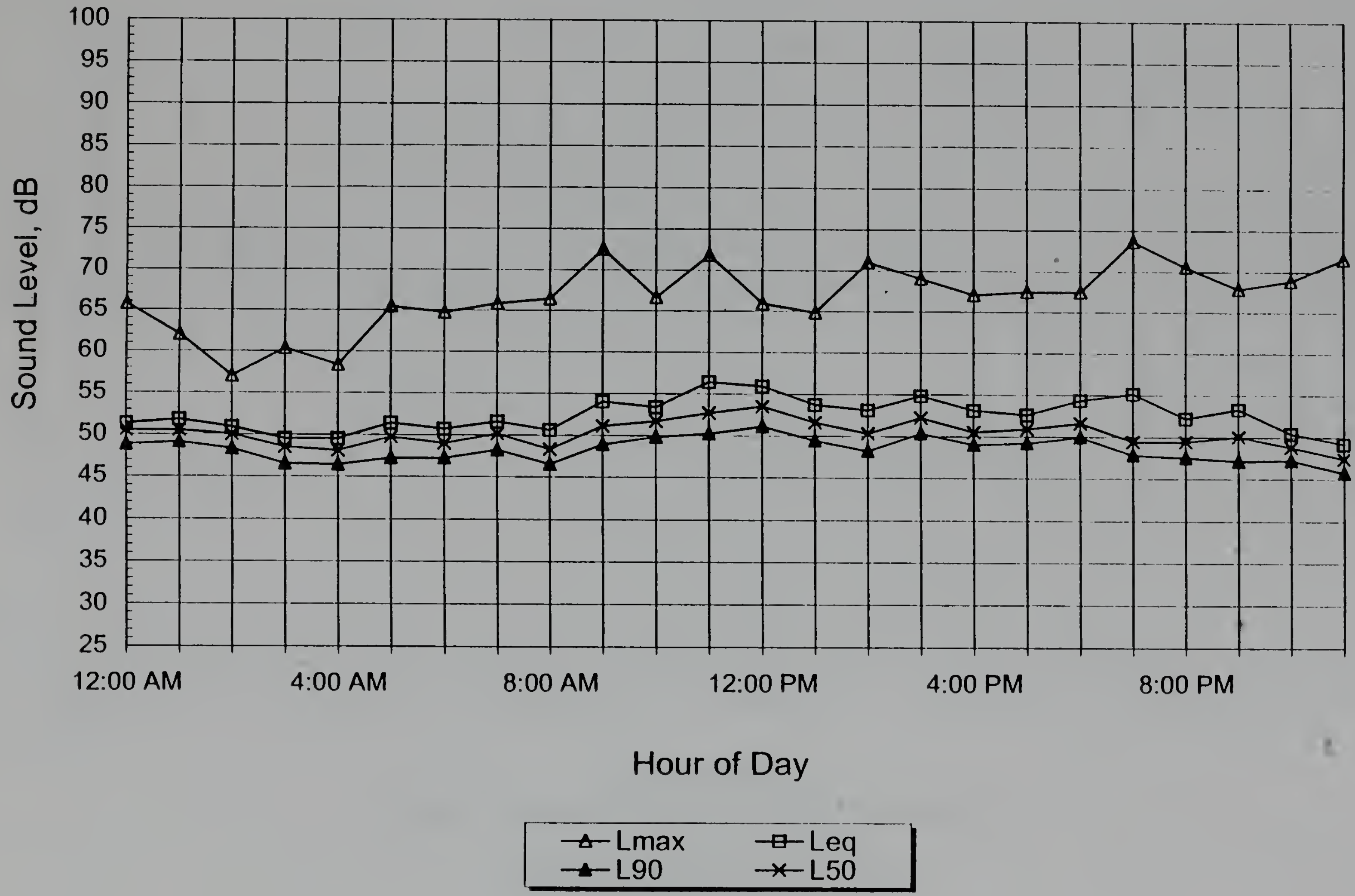
December 18, 1999



Measured Hourly Noise Levels

Site 5: 2928 Kentridge Drive- Milpitas, CA

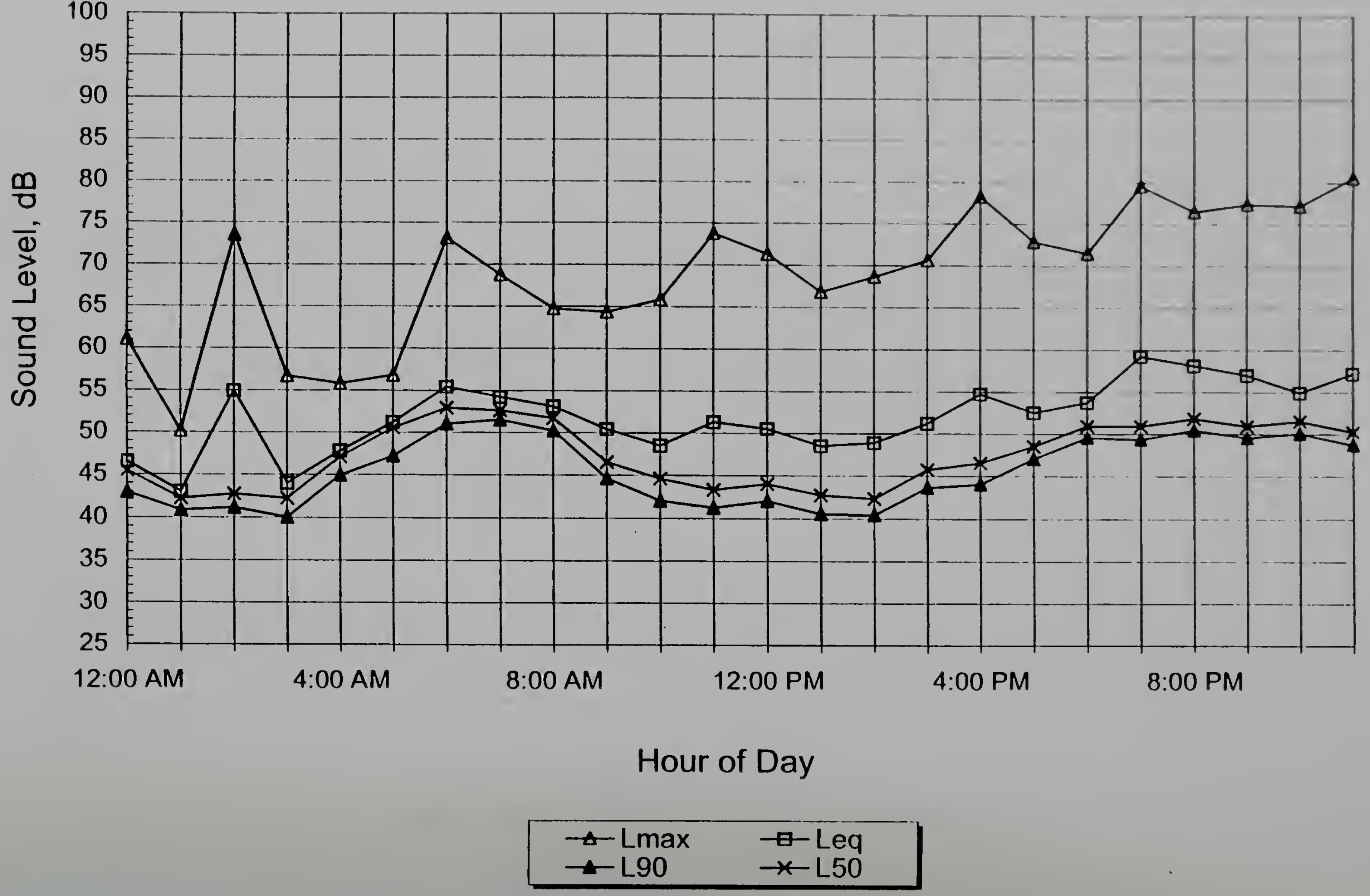
December 19, 1999



Measured Hourly Noise Levels

Site 5: 2928 Kentridge Drive- Milpitas, CA

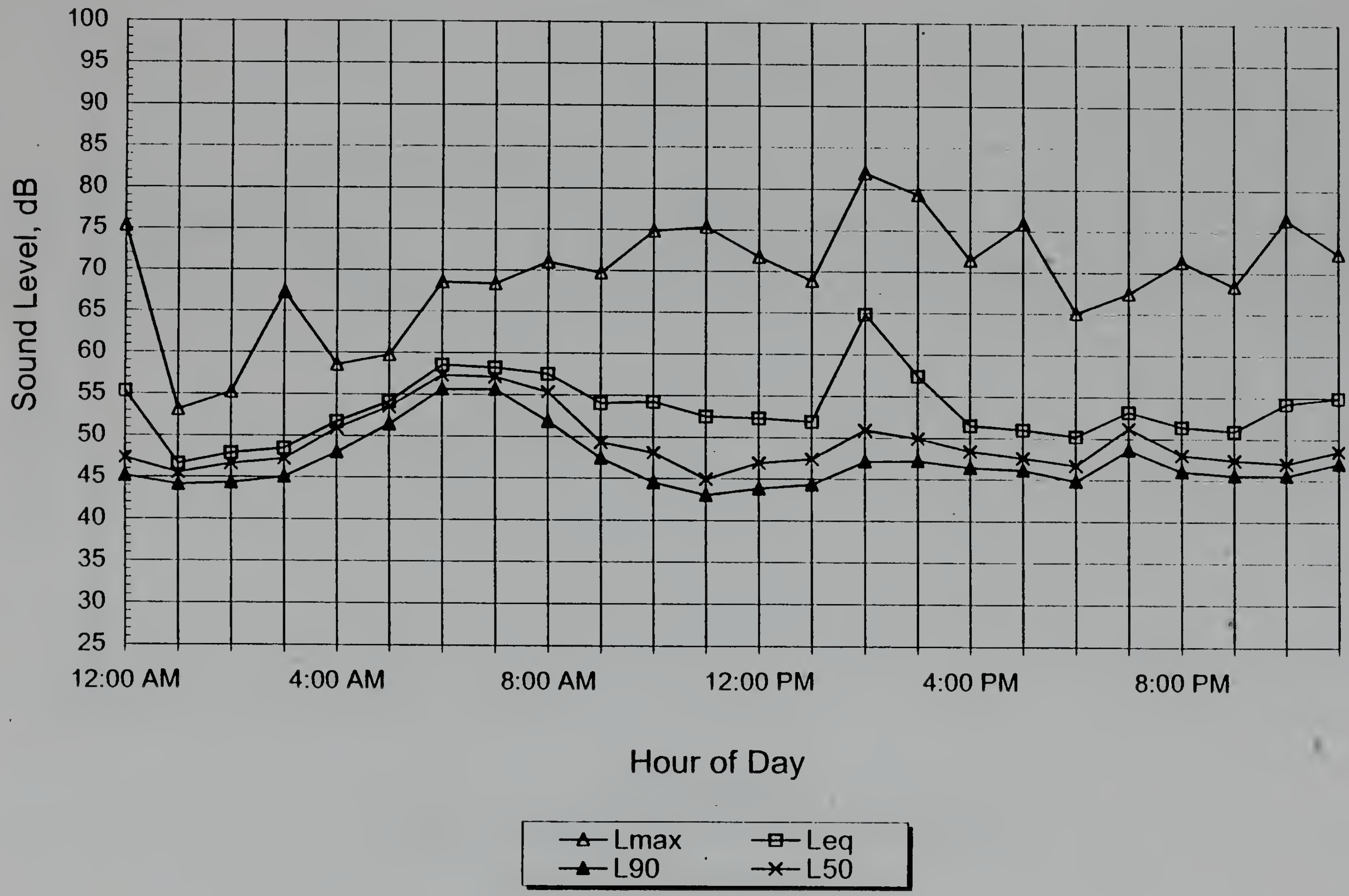
December 20, 1999



Measured Hourly Noise Levels

Site 5: 2928 Kentridge Drive- Milpitas, CA

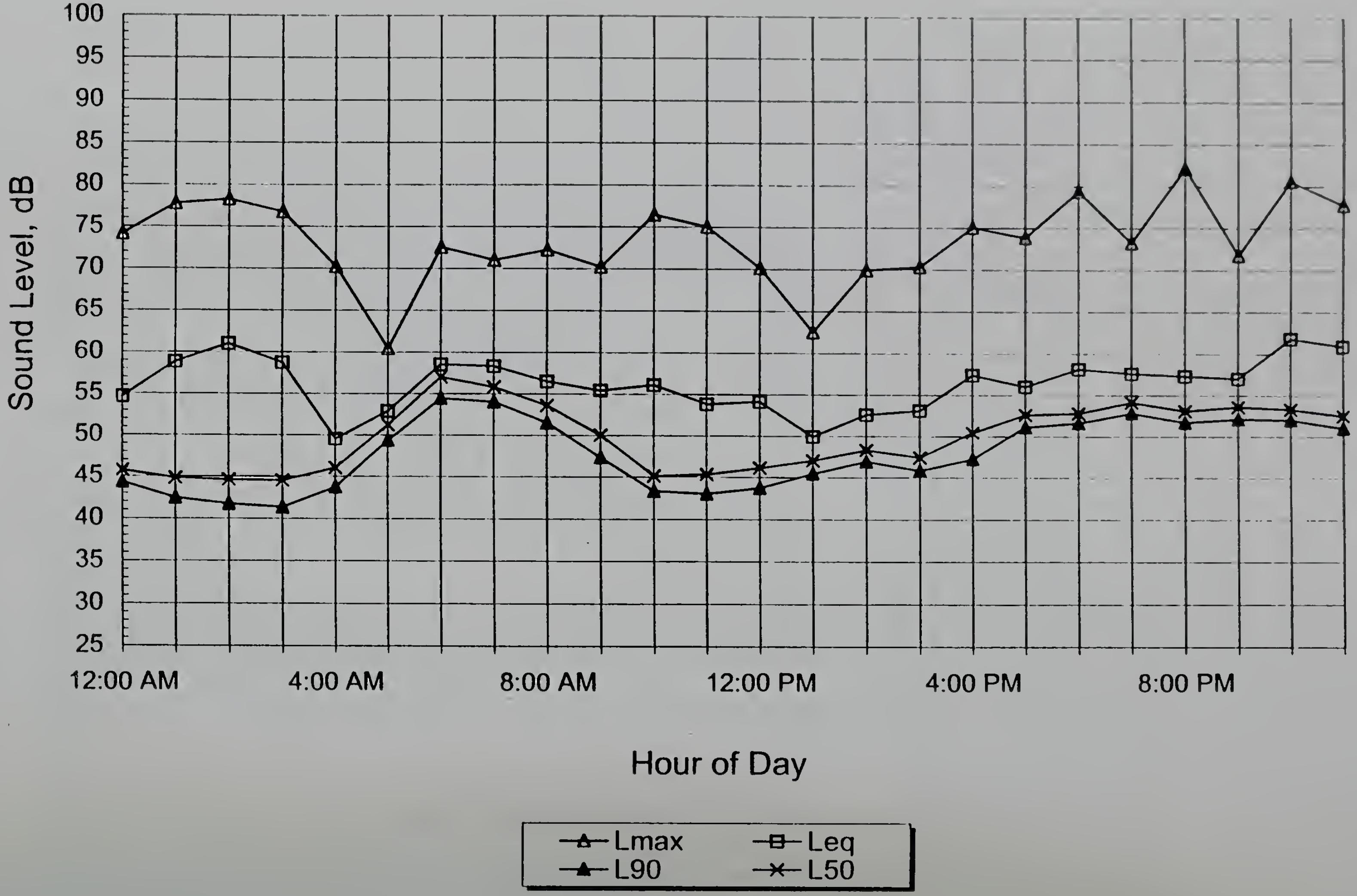
December 21, 1999



Measured Hourly Noise Levels

Site 5: 2928 Kentridge Drive- Milpitas, CA

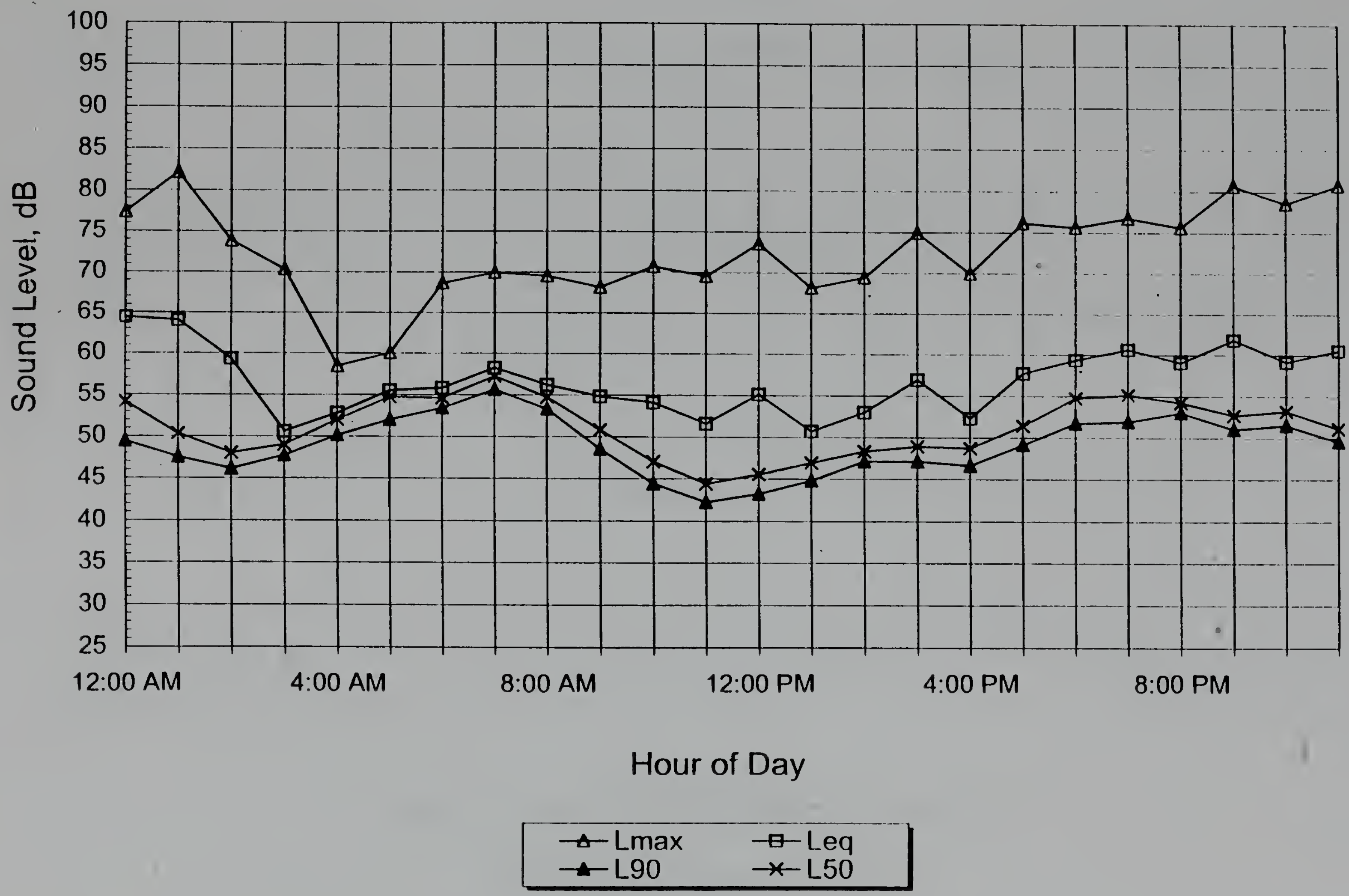
December 22, 1999



Measured Hourly Noise Levels

Site 5: 2928 Kentridge Drive- Milpitas, CA

December 23, 1999



Brown Buntin Associates Inc.
Measured Hourly Noise Levels
Site 5: 2928 Kentridge Drive- Milpitas, CA
December 17, 1999

Hour	Leq	Lmax	L50	L90
0:00	62.1	81.0	49.5	47.3
1:00	50.7	70.8	48.4	46.3
2:00	52.7	72.4	47.1	45.5
3:00	49.5	57.3	48.7	47.0
4:00	51.0	59.9	50.2	48.2
5:00	56.6	73.0	55.5	51.9
6:00	57.9	69.4	56.2	54.9
7:00	58.2	71.0	56.3	54.8
8:00	57.7	70.6	54.6	51.7
9:00	64.3	83.4	52.6	49.8
10:00	60.5	72.3	52.9	50.9
11:00	58.7	72.0	50.3	45.8
12:00	56.5	71.0	52.2	47.0
13:00	52.9	68.0	48.7	46.3
14:00:00	56.4	71.0	52.5	48.4
15:00:00	55.8	74.0	49.9	47.6
16:00:00	56.8	74.5	52.4	50.9
17:00:00	55.4	68.4	50.9	49.5
18:00:00	59.7	74.0	54.4	51.8
19:00:00	63.8	81.8	56.7	55.1
20:00:00	62.3	79.1	54.7	53.2
21:00:00	61.6	80.1	53.8	52.3
22:00:00	56.6	75.7	53.9	52.5
23:00:00	56.4	70.8	54.7	52.7

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	64.3	49.5	59.9	56.6	58.9
Lmax	83.4	57.3	76.9	74.2	76.0
L50	56.7	47.1	53.4	52.8	53.2
L90	55.1	45.5	50.3	49.6	50.1

Ldn	63.7
CNEL	64.4

Brown Buntin Associates Inc.
Measured Hourly Noise Levels
Site 5: 2928 Kentridge Drive- Milpitas, CA
December 18, 1999

Hour	Leq	Lmax	L50	L90
0:00	52.1	60.7	51.3	49.6
1:00	49.3	57.3	48.4	46.9
2:00	48.7	60.8	47.4	45.7
3:00	48.2	53.7	47.3	46.0
4:00	50.4	72.3	47.6	46.1
5:00	51.4	56.2	50.8	49.1
6:00	54.1	67.5	51.8	50.4
7:00	55.8	68.0	54.0	51.8
8:00	55.8	68.5	52.8	51.3
9:00	53.8	70.4	50.1	48.1
10:00	50.9	67.0	46.2	44.4
11:00	53.6	72.2	49.3	47.2
12:00	53.6	72.6	50.2	48.8
13:00	53.0	70.0	49.7	47.0
14:00:00	53.2	75.1	48.2	45.3
15:00:00	53.8	71.6	49.8	48.2
16:00:00	54.1	69.7	51.8	50.1
17:00:00	55.5	72.3	53.0	51.3
18:00:00	55.9	73.1	52.8	49.3
19:00:00	58.9	75.6	52.3	50.2
20:00:00	59.1	78.7	51.6	50.0
21:00:00	57.4	73.3	51.3	49.7
22:00:00	61.2	76.5	53.8	50.8
23:00:00	57.0	73.7	51.8	49.6

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	61.2	48.2	55.5	54.8	55.3
Lmax	78.7	53.7	73.0	70.2	72.2
L50	54.0	46.2	51.3	50.6	51.0
L90	51.8	44.4	48.8	48.2	48.6

Ldn	61.3
CNEL	61.9

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 5: 2928 Kentridge Drive- Milpitas, CA

December 19, 1999

Hour	Leq	Lmax	L50	L90
0:00	51.3	65.7	50.5	48.8
1:00	51.8	62.0	50.5	49.1
2:00	50.9	57.0	50.0	48.3
3:00	49.5	60.3	48.5	46.5
4:00	49.5	58.3	48.1	46.4
5:00	51.4	65.4	49.7	47.2
6:00	50.7	64.7	49.0	47.2
7:00	51.6	65.8	50.1	48.2
8:00	50.6	66.4	48.3	46.5
9:00	54.0	72.5	51.1	48.9
10:00	53.4	66.6	51.7	49.8
11:00	56.4	71.8	52.7	50.2
12:00	55.9	65.9	53.5	51.1
13:00	53.7	64.8	51.6	49.4
14:00:00	53.1	71.0	50.3	48.2
15:00:00	54.8	69.0	52.2	50.3
16:00:00	53.1	67.0	50.5	49.0
17:00:00	52.6	67.4	50.9	49.2
18:00:00	54.3	67.4	51.6	49.9
19:00:00	55.1	73.6	49.4	47.8
20:00:00	52.2	70.5	49.4	47.5
21:00:00	53.3	67.8	50.0	47.1
22:00:00	50.4	68.8	48.8	47.2
23:00:00	49.2	71.5	47.4	45.7

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	56.4	49.2	53.9	50.6	52.9
Lmax	73.6	57.0	69.4	66.0	68.4
L50	53.5	47.4	51.1	49.3	50.5
L90	51.1	45.7	48.9	47.4	48.3

Ldn	57.7
CNEL	58.1

Brown Buntin Associates Inc.
Measured Hourly Noise Levels
Site 5: 2928 Kentridge Drive- Milpitas, CA
December 20. 1999

Hour	Leq	Lmax	L50	L90
0:00	46.5	61.0	45.4	42.9
1:00	43.0	50.1	42.2	40.8
2:00	54.9	73.5	42.7	41.1
3:00	44.0	56.7	42.2	40.0
4:00	47.8	55.8	47.1	44.9
5:00	51.2	56.8	50.5	47.2
6:00	55.4	73.1	52.9	51.0
7:00	54.2	68.7	52.6	51.5
8:00	53.1	64.7	51.7	50.2
9:00	50.4	64.3	46.5	44.6
10:00	48.5	65.8	44.6	42.0
11:00	51.3	73.7	43.3	41.2
12:00	50.5	71.3	44.0	42.0
13:00	48.5	66.8	42.7	40.5
14:00:00	48.9	68.6	42.3	40.4
15:00:00	51.2	70.6	45.7	43.6
16:00:00	54.7	78.2	46.5	44.0
17:00:00	52.5	72.8	48.5	47.0
18:00:00	53.7	71.4	50.9	49.5
19:00:00	59.2	79.5	50.9	49.3
20:00:00	58.1	76.4	51.8	50.4
21:00:00	57.0	77.3	50.9	49.5
22:00:00	54.9	77.1	51.5	50.0
23:00:00	57.2	80.5	50.2	48.7

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	59.2	43.0	54.1	52.9	53.7
Lmax	80.5	50.1	73.8	73.7	73.8
L50	52.9	42.2	48.9	48.9	48.9
L90	51.5	40.0	45.7	45.2	45.5

Ldn	59.5
CNEL	60.3

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 5: 2928 Kentridge Drive- Milpitas, CA

December 21, 1999

Hour	Leq	Lmax	L50	L90
0:00	55.3	75.3	47.3	45.1
1:00	46.6	53.1	45.5	44.1
2:00	47.9	55.2	46.6	44.3
3:00	48.5	67.2	47.2	45.0
4:00	51.7	58.5	50.9	48.0
5:00	54.1	59.7	53.5	51.4
6:00	58.5	68.5	57.3	55.6
7:00	58.2	68.3	57.1	55.6
8:00	57.5	71.0	55.3	51.8
9:00	54.0	69.7	49.3	47.4
10:00	54.2	74.8	48.1	44.5
11:00	52.5	75.3	44.9	43.0
12:00	52.3	71.7	46.9	43.8
13:00	51.9	68.8	47.4	44.3
14:00:00	64.8	81.9	50.9	47.1
15:00:00	57.4	79.3	49.9	47.2
16:00:00	51.5	71.4	48.4	46.4
17:00:00	51.0	75.8	47.6	46.1
18:00:00	50.2	65.0	46.7	44.8
19:00:00	53.2	67.4	51.2	48.6
20:00:00	51.4	71.3	48.0	46.0
21:00:00	50.9	68.3	47.4	45.5
22:00:00	54.2	76.4	47.0	45.5
23:00:00	54.9	72.3	48.5	47.0

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	64.8	46.6	56.5	53.9	55.7
Lmax	81.9	53.1	74.6	70.8	73.6
L50	57.3	44.9	50.7	51.2	50.9
L90	55.6	43.0	46.8	47.3	47.0

Ldn	60.8
CNEL	60.9

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 5: 2928 Kentridge Drive- Milpitas, CA

December 22, 1999

Hour	Leq	Lmax	L50	L90
0:00	54.6	74.1	45.7	44.3
1:00	58.8	77.7	44.8	42.4
2:00	61.0	78.2	44.6	41.7
3:00	58.7	76.7	44.5	41.3
4:00	49.5	70.2	46.0	43.7
5:00	52.9	60.4	51.2	49.3
6:00	58.5	72.5	57.0	54.4
7:00	58.3	71.0	55.8	54.0
8:00	56.5	72.2	53.6	51.5
9:00	55.4	70.2	50.0	47.3
10:00	56.1	76.4	45.1	43.3
11:00	53.8	75.0	45.3	43.0
12:00	54.1	70.1	46.1	43.7
13:00	49.9	62.5	47.0	45.4
14:00:00	52.6	69.9	48.3	46.9
15:00:00	53.1	70.3	47.4	45.8
16:00:00	57.4	75.0	50.4	47.2
17:00:00	56.0	73.8	52.6	51.1
18:00:00	58.1	79.3	52.8	51.6
19:00:00	57.6	73.2	54.1	52.8
20:00:00	57.3	82.1	53.1	51.7
21:00:00	57.0	71.7	53.6	52.1
22:00:00	61.8	80.5	53.3	52.0
23:00:00	60.9	77.7	52.5	51.0

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	61.8	49.5	56.1	58.8	57.3
Lmax	82.1	60.4	75.1	76.5	75.7
L50	57.0	44.5	51.6	51.2	51.4
L90	54.4	41.3	48.5	46.7	47.8

Ldn	64.9
CNEL	65.1

Brown Buntin Associates Inc.

Measured Hourly Noise Levels

Site 5: 2928 Kentridge Drive- Milpitas, CA
December 23, 1999

Hour	Leq	Lmax	L50	L90
0:00	64.4	77.3	54.1	49.4
1:00	64.0	82.1	50.3	47.5
2:00	59.3	73.8	48.0	46.1
3:00	50.6	70.3	49.0	47.7
4:00	52.8	58.4	52.0	50.1
5:00	55.5	60.0	54.7	52.0
6:00	55.8	68.6	54.6	53.4
7:00	58.2	69.9	57.2	55.6
8:00	56.2	69.5	54.7	53.3
9:00	54.8	68.1	50.8	48.5
10:00	54.1	70.7	47.0	44.4
11:00	51.6	69.5	44.4	42.2
12:00	55.1	73.5	45.5	43.2
13:00	50.7	68.1	46.9	44.8
14:00:00	53.0	69.4	48.3	47.1
15:00:00	56.9	74.9	48.9	47.1
16:00:00	52.3	69.9	48.7	46.6
17:00:00	57.7	76.1	51.4	49.1
18:00:00	59.3	75.6	54.7	51.7
19:00:00	60.6	76.7	55.1	51.9
20:00:00	59.0	75.6	54.2	53.0
21:00:00	61.8	80.6	52.7	51.0
22:00:00	59.1	78.5	53.2	51.5
23:00:00	60.5	80.7	51.1	49.5

Metric	High	Low	Daytime Average	Nighttime Average	24-Hour Average
Leq	64.4	50.6	57.3	60.0	58.5
Lmax	82.1	58.4	74.2	77.0	75.5
L50	57.2	44.4	52.3	52.5	52.3
L90	55.6	42.2	48.6	49.7	49.0

Ldn	66.1
CNEL	66.4

APPENDIX H

BCDC CONSISTENCY DETERMINATION LETTER

GRAY DAVIS, *Governor*

STATE OF CALIFORNIA

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
THIRTY VAN NESS AVENUE, SUITE 2011
SAN FRANCISCO, CALIFORNIA 94102-6080
PHONE: (415) 557-3686

November 30, 1999

Federal Aviation Administration
U.S. Department of Transportation
P.O. Box 92007
Worldway Postal Center
Los Angeles, California 90009

ATTENTION: Keith Lusk, Environmental Planner

SUBJECT: **Request for Amendment to BCDC Consistency Determination CN18-91**

Dear Mr. Lusk:

Thank you for your letter requesting to amend the above referenced consistency determination to include removal of a localizer, equipment shelter, localizer platform, DME and security fence. Commission staff has reviewed your request and determined that no Commission action is necessary for this equipment removal. We will include your letter in Consistency Determination No. CN18-91 so that the file contains the most current information on the site status.

Sincerely,

Leslie Lacko

LESLIE LACKO
Coastal Program Analyst